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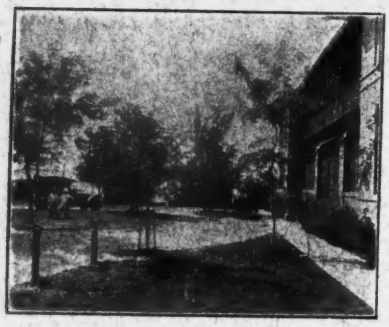

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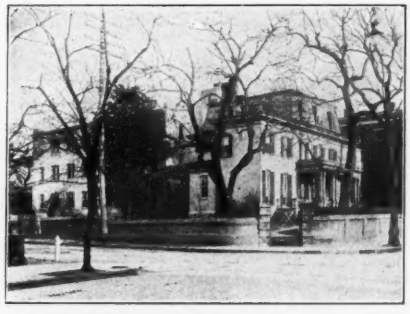

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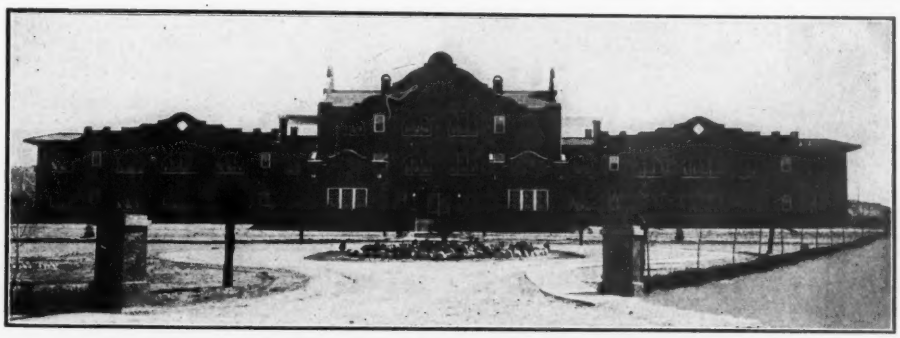

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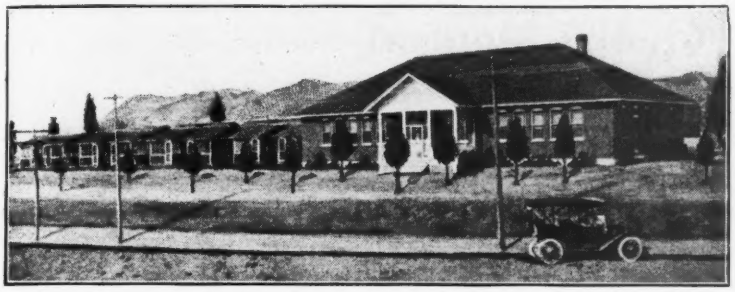

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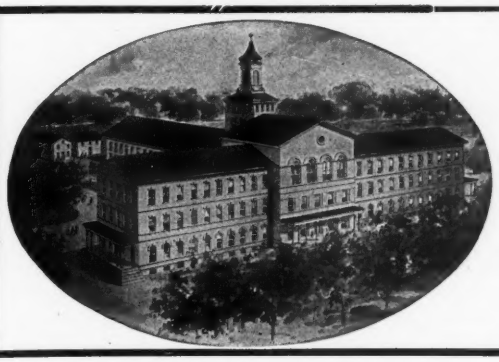

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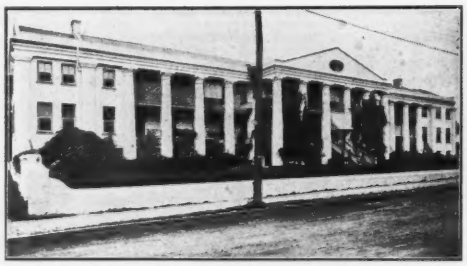

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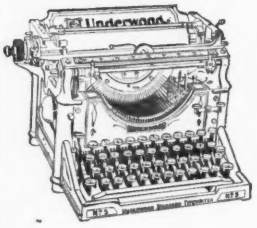

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Volume IX | MAY 1, 1916 | Number 5

MEDICINE

(INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.)

FURTHER EXPERIENCES IN THE DIETETIC TREATMENT OF BRONCHIAL ASTHMA*.

By Allan Eustis, B.S., Ph.B., M.D.

Assistant Professor of Dietetics and Nutritional Diseases, Post-Graduate School of Medicine, Tulane University,

New Orleans, La.

Bronchial asthma is a condition associciated with so many pathological conditions that for many years I have urged the recognition of it, not as a distinct disease, but as a symptom complex, at times associated with cardiac disease, at others, with uremia, and as reported before this society last year by Ulmann, even with gall stones and duodenal ulcer. Recently B. C. Davies has advocated the same idea.

Such terms as cardiac asthma and thymic asthma only tend to increase the confusion as to its true pathology. The term "bronchial asthma" should include only those cases of paroxysmal dyspnoea with prolonged expiratory murmur and great expiratory effort, in which there are sibilant rales over both lungs. That the attack is due to spasm of the bronchioles, as shown by Brodie and Dixon, I believe is generally accepted; and the theory that the dyspnoea is due to turgescence and oedema of the mucous membrane of the bronchioles has long since been discarded. That the true pathology is not fully understood is evidenced by even recent articles on thymic asthma; and to the fact that during the past two years I have had four cases of mediastinal tumor referred to me by physicians as cases of asthma. Two of these were due to pressure of indurated bronchial glands and two to aneurism of the arch of the aorta, but in whom no bruit was audible. In all four the mediastinal dulness was markedly increased; the dyspnoea was not paroxysmal except that the recumbent posture brought on an attack, associated with coughing; and auscultation revealed the presence of loud sonorous and mucous rales, instead of the high pitched sibilant rale characteristic of asthma; while the characteristic, long, expiratory murmur was absent. I cannot too strongly urge, therefore, the importance of a routine percussion of the mediastinal space as an aid in arriving at a correct diagnosis. The dyspnoea in these cases as well as in so-called "thymic asthma," is due to pressure on the larger bronchi or trachea and the physical signs are quite different and characteristic in the two conditions. When in doubt, the X-ray at once settles the diagnosis.

The cause of the spasm of the bronchioles, however, is still an unsettled question, and in current articles one sees a great variety of opinions expressed. Patton, Farrell and others still cling to the reflex theory; still others, as exemplified by Goldschmidt and Saenger, believe the underlying cause is in an inherited neurosis, while Meltzer, Koessler and Moody, Babcock, and Goodale mention it as a symptom of anaphylaxis. All these theories are simply interchanges of words and give no indications for a rational therapy of the distressing symptoms.

A complete review of the literature

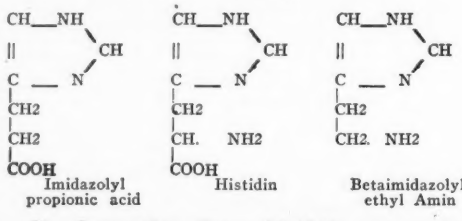
*Read in Section on Medicine, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

upon asthma is manifestly impossible in a paper such as this, and for the convenience of subsequent investigators an extensive bibliography is appended.

In 1909 before the Louisiana State Medical Society the writer reported in detail several cases of bronchial asthma, representative of twenty-one at that time observed in which complete relief had been obtained by dietetic measures alone, and the work of Rochester and of Jack along the same lines was alluded to. The suggestion was advanced by me then, that the symptom complex was caused by the absorption of some intestinal poison, in the following words: "The fact that I have found evidence of autointoxication in every case of asthma examined by me for four years, leads me to believe that during the attack there is some toxin in the blood which acts similarly to muscarin." (Brodie and Dixon showed that muscarin is capable of causing violent spasm of the bronchioles). At that time the number of cases observed did not warrant any conclusions being drawn, but each case of asthma observed by me since then has been followed in detail, and toxic and other factors carefully noted. In all I have seen one hundred and seventy-eight cases of asthma, and have been able to follow carefully the effect of eliminative treatment, an analysis of which will be given later.

In 1911 while working with Prof. Karl von Noorden and Prof. Richard Kraus in Vienna, an opportunity presented itself to prove or disprove the hypothesis of the toxic pathogenisis of asthma formulated in my own mind, and the results of this investigation were reported in the American Journal of the Medical Sciences in June, 1912.

A few references to this investigation will not be amiss. The conclusion that the Charcot-Leyden crystals found in asthma were amins similar to cadaverin and putrescin, and the result of putrefaction of proteins, was arrived at by their presence in fetid diarrhoea and from chemical investigation. This led to a review of the literature regarding the physiological action of the several amins, and it was found that Barger and Dale, while attempting to isolate the active principle of ergot, had obtained a base which they identified as Betaimidazolylethylamin, which when injected into guinea pigs, cats and rabbits, stimulated contraction of unstriped muscular fibre, not only in the uterus, but in the bronchioles as well. Kutscher discovered a base in extract of ergot which had the same physiological action. Looking up earlier investigations it was found that Ackermann had described a similar base obtained by the putrefaction of histidin, while Windhaus and Voigt, as early as 1907, had obtained it synthetically from imidazolylpropionic acid by the following steps:



Imidazolyl propionic acid — Histidin — Betaimidazolyl-ethyl Amin

Its formation from histidin, an amino acid formed in the normal peptolytic digestion of proteids, is therefore clearly proven. In animals the intravenous administration of the base is followed by characteristic asthmatic symptoms, and in one instance, Prof. Kehrer, of Berne, while using it as an emenagogue, reports violent asthma following its administration. Through the courtesy of Dr. Dale I was enabled to secure a large supply of the base, and, that not only experimental asthma, but also experimental urticaria can be produced by it, I think I have conclusively shown.

Matthews in an analysis of three hundred cases of asthma examined in the Mayo clinic, states that in over 90 per cent of the cases the etiological factor might be found in chronic suppuration or the retention of mucoid secretions in the nose or accessory sinuses. Treatment was directed toward the object of securing free and continuous drainage and relief was directly proportional to the success in obtaining free drainage, no attention being paid to any reflex factors. He very aptly calls attention to the fact that the relief of asthma by any known means does not mean that the patient is permanently cured, since the susceptibility remains throughout life, and symptoms will recur whenever there exist conditions favorable to the production and absorp-

tion of the specific antigen to which the individual is sensitive.

Abbott, in a most excellent article, has very recently again called attention to the necessity for securing drainage of the ethmoid cells, and he regards asthma as essentially a toxic condition. While he considers the nasal condition as the principal etiological factor, he admits that the absorption of intestinal poisons may help to aggravate the condition. Freudenthal, Keiper and a few others, still holding to the reflex cause of asthma, endeavor to overcome the condition by the introduction of the bronchoscope and local applications of cocaine and adrenalin. An analysis of their results, however, does not reveal such good results as have been obtained by endeavoring to ascertain and remove the source of the toxic substances being absorbed.

The tendency at present is to explain the toxic manifestations by the magic word "anaphylaxis," which to my mind is as ambiguous as the word neurosis. As Vaughan has very aptly urged, the word anaphylaxis should be stricken from medical literature, and his painstaking researches, as well as those of Emil Abderhalden, have cleared up many of the obscure points in the earlier work of Gay and Southard, Auer and Lewis, Biedl and Kraus and others. He proposes the name "protein sensitization" in place of "anaphylaxis," and he has shown that when a foreign protein is introduced parenterally into an animal, it is slowly digested, the endothelial cells of the body being stimulated to the formation of a specific ferment which will digest the particular protein to which it has been sensitized. He has further shown that in every protein molecule there is a poisonous group of atoms set free when the protein molecule is digested parenterally: and that the symptoms of so-called anaphylaxis, or serum sickness are due to this poisonous group of atoms. Minute quantities of protein can sensitize the cells, Rosenau and Anderson finding that one millionth of a cubic centimeter of horse serum is sufficient to sensitize a guinea pig. *However, the severity of the symptoms on the second injection are dependent upon the size of the dose and the rapidity of its digestion.*

It must be remembered, as pointed out by Biedl and Kraus, and also by Modrakowski, that bronchial spasm is only one of the symptoms of anaphylaxis, the diminished blood pressure, incoagulability of the blood, secretion of pancreatic juice, and lowered body temperature being also noted as basic phenomena of the condition, while in the human being we are accustomed to regard urticaria as a symptom.

In reporting the results of my investigations with betaimidazolylethylamin, already referred to, I stated, "It is possible that in injecting a foreign serum a mixture of nitrogenous toxic bases is also injected, which is ordinarily detoxicated, but which is not detoxicated by the tissues on the second injection of serum owing to the previous injection having exhausted this hypothetical detoxicating substance." In no other way can I see any explanation of the urticaria met after a first injection of horse serum, which may not be manifested on the second injection, and also the few cases of human serum sickness which have been reported.

It is more rational to me to suppose that in asthma there is some toxic substance being absorbed either from the intestinal canal, or from an alveolar abscess cavity, or ethmoid cells, which poison may be rendered inert in certain individuals, but which in the asthmatic exerts its physiological effect, due to the individual having lost his power to detoxicate it. It is conceivable that the asthmatic individual may develop a tolerance or resistance to the poison, and in this way "outgrow" his asthma. Only by such a conception can one explain the good results reported from the use of phylacogens, and autogenous vaccines, as advocated by Babcock, and by Koessler and Moody, and from repeated injections of serum, advocated by Widal, Lermoyez, Abrami and others. Betaimidazolylethylamin meets all the requirements of such a hypothetical poison, as it produces asthma and urticaria, and *can be detoxicated,* as I showed by working with the liver of Cathartes Aura, the ordinary turkey buzzard. However, it does not produce all symptoms of anaphylactic shock and it is, therefore, probable that in the latter condition there are several poisons elaborated from the protein molecule.

The purpose of this paper is to report the excellent results obtained by attempt-

ing to eliminate from the dietary such articles of food as contain large amounts of histidin; not that it is claimed that intestinal putrefaction of histidin with subsequent formation of betaimidazolylethylamin is the sole cause of asthma, but to show that without the added source from the intestinal canal many cases of asthma progress favorably without drainage of nasal foci. However, it is not intended to convey the idea that focal infections are of minor importance as a causative factor in producing the asthmatic symptoms, for attention to the naso pharynx has been one of the first procedures insisted upon in all of my cases. It is in those cases in which free drainage has been established with no improvement that the diet is the all important factor.

In the one hundred and seventy-eight cases observed by me, only three, or 1.7 per cent., failed to show a strong reaction for indican in the urine, during, or immediately following the asthmatic attack, while eliminative treatment and dietetic measures aimed at overcoming the attendant intestinal toxemia, gave complete relief in all but ten cases. A short review of a few of the successful cases in addition to those reported in 1909 will show how striking is the effect of diet, while a like review of the ten unsuccessful cases will demonstrate that the effect of dietetic measures in these latter was not allowed an opportunity to be noted in any but one, and in this case there was a persistent absence of indicanuria.

Case I. E. W. M., white male, 58 years of age; seen first April 14, 1914, with a history of asthma since 21 years of age, which for the past two years had been almost constant. Physical examination showed typical asthmatic rales, heart hypertrophied but no valvular lesions. Blood pressuse 160 — 120 = 40. Otherwise apparently normal except for a movable right kidney. Urine alkaline 1010, negative for albumin, urobilinogen, bile pigments, acetone, sugar and casts. Indican plus 4. He was put upon the usual eliminative treatment and diet (referred to later). In forty-eight hours he was free from all signs of asthma, and he remained so until May 4, 1914. His urine remained free from indican until then, when he had another attack of asthma after indulging in raw oysters, when his urine showed an indican reaction of plus 6. He was again put upon the same line of treatment with relief in twenty-four hours. He was instructed in making tests for indican upon his own urine, as he was compelled to return to Chicago. He was able, therefore, to regulate his own diet by the indican test and not since May 4, 1914, has he had a single suspicion of asthma. Today he is able to play 18 holes of golf and his weight is 146 pounds, a gain of 19 pounds, as he weighed 127 pounds when he first consulted me. His upper respiratory tract was examined by Dr. Lynch, but nothing abnormal was noted.

Case II. H. M., white male, 52 years of age, an asthmatic all his life; consulted me July 29, 1912, presenting the characteristic signs of asthma on examination with marked emphysema of both lungs, and a dilated heart with a systolic blood pressure of only 120. Urine contained some pus and erythrocytes, a few granular casts, but no albumen, and an indican test of plus 6. Eliminative and dietetic treatment was effective, as can be noted from the following excerpt from a letter received from him last year: "It is the first winter in the last twenty-five years that I passed without one attack."

Case III. W. L. H., a lawyer, 45 years of age; was referred to me by Dr. A. L. Metz, Dec. 8, 1911, for asthma of eight years' duration. The previous week he had had a severe attack while in Covington, La., where he had gone expecting that the ozone belt air might give him some relief. Physical examination: Robust man with typical sibilant rales over both lungs and wheezing audible across the room while examining him. Systolic blood pressure 100. Indican plus 8. Eliminative treatment and low proteid diet gave marked relief in twenty-four hours, and in three days no rales could be found in his chest. He was fairly well versed in medical matters, being connected with the City Board of Health, and has been able to co-operate unusually well in the dietetic handling of his case, so that he has had complete relief for almost four years.

Case IV. M. L., white clerk, 20 years of age; was seen by me March 8, 1913, with typical asthma dating back to when he was four years of age. His attacks have been a serious hindrance to him in getting ahead in the world. Physical examination shows marked emphysema and sibilant rales in both lungs. Systolic blood pressure 120. Urine shows an excess of indican. Rhinological examination by Dr. Landfried showed a deviated septum on the left side with hypertrophy of turbinates on each side, muco-purulent discharge falling from upper nasal fossa. Operation advised by both Dr. Landfried and myself. However, results of eliminative and dietetic treatment have been so successful that he has had only three attacks to date, always the result of indiscretions in diet, and promptly relieved along the same line of treatment, so that he still refuses to have operation performed.

Case V. F. M., engineering student 20 years old. When first seen, Nov. 25, 1912, presented asthma with emphysema, which dated back to four years of age. He resided in Canada during the years 1910 and 1911, when he was free from attacks, but since coming to New Orleans on Oct. 6, 1912, he had had three severe attacks. Physical examination revealed loud sibilant rales over both lungs, marked emphysema. Blood pressure 115 — 90 = 25. Indican plus 6. After rhinological examination, Dr. Landfried wrote: "There is marked deviation of the perpendicular plate of the ethmoid, high up and far back in the right nostril with contact sufficient to keep up

continuous irritation and turgescence of the turbinal tissues. There may be some other cause in his case for the asthma, but I have never seen any in my experience more potent than the one in his nose. Regardless of the possibility of other causes, I strongly urge the removal of his septum by submucous resection." On account of the ease with which patient overcame attacks, and the fewness of them, always on account of eating unwisely, he has consistently refused operation and has not had an attack since December, 1914, when a decayed molar tooth was withdrawn and an alveolar abscess drained. In this case it is interesting to note that for two weeks previous to withdrawal of the tooth his attacks had returned and he ran a persistent, heavy indicanuria, with asthma, which subsided at the same time after drainage of the alveolar abscess.

An analysis of the ten unsuccessful cases reveals eight cases with excess of indican, one with a plus 2, and one with a negative indican. This last case, W. D. P., was not influenced by diet, but examination by Dr. W. T. Patton, who has reported it elsewhere, showed "A septum badly deflected to the left and high up, pressing on middle turbinate, deflected to right in lower part, touching hypertrophied inferior turbinate. Pus coming from right ethmoid region. Tonsils submerged." Curettage of ethmoid cells, submucous removal of septum nasi and numerous doses of phylacogens (75 cc. in all), gave complete relief. This is one instance in which the causative factor was undoubtedly entirely situated in the nose. Of the other cases, the patient with only plus 2 indican, J. H., Jr., had had complete relief for two months after dietetic measures, but after going to his home in Mississippi, has had a return of asthma and examination of urine shows a negative indican. I have classed this case also as unsuccessful, but on account of the great distance I am not in a position to state what the exact condition may be. Of the remaining eight unsuccessful cases, two were morphine addicts, and on this account thorough elimination was impossible and the urine always gave a strong reaction for indican. The other six cases were patients whose diets I could not control, and although four of them have been through the hands of competent rhinologists, they are still victims of the attacks.

TREATMENT.

Treatment has been directed towards avoiding attacks, with the idea constantly in mind that they are due to absorption of a proteolytic toxin, either from the nose, accessory sinuses, or intestinal canal. Before even any attention is paid to the naso-pharynx, free catharsis is obtained by calomel, phenolphthalein and rhubarb, and if the lung sounds denote a dry condition of the bronchioles, syrup of hydriodic acid is given to the point of iodism. Patients are put on a diet in which the histidin content is nil for three days, followed by one in which the histidin is extremely low. The histidin content of the various foods are given in the following table, taken mostly from Osborne's analyses:

Protein.	Source.	Histidn
Syntonin	Meat	2.66
Caseinogen	Milk	2.60
Gelatin	Tendons	0.40
Witte	Peptone	1.12
Amandin	Almonds	1.53
Edestin	Hemp	2.19
Sturin	Fish	12.9
Hemoglobin	Blood	10.93
Vignin	Cow peas	3.08
Legumin	Sweet peas	2.5
Phaseolin	Beans	2.6
Gliadin	Wheat	1.7
Protamin	Rye	0.39
Zein	Maize	0.81

Therefore, animal foods are eliminated as much as possible from the dietary, while the administration of an active culture of bacillus Bulgaricus is given. In this connection it may be well to call attention to the fact that I have found that free hydrochloric acid promptly kills this organism, and for success in its administration it should be given one hour before meals when the acid content of the stomach is at its least strength. Starches will be found to be a better source of lactic acid even than sugar, as the latter is so rapidly absorbed.

Another danger which I wish to caution against is the tendency on the part of patients to live on too restricted a diet, with the probability of developing pellagra, as claimed by Goldberger. One case, Mrs. M. M. K., living some sixty miles from New Orleans, in her efforts to cooperate, developed a typical erythema of both hands, which Dr. Menage pronounced as undoubtedly pellagra. She had failed to include peas and beans in her dietary and on a full diet the condition promptly vanished, but with no return of her asthma.

A review of these one hundred and sev-

enty-eight cases justifies the following conclusions:

1. Most cases of bronchial asthma are due to absorption of proteolytic toxins.
1. These toxins may be absorbed from a suppurating accessory sinus in the nose, or from the intestinal canal.
3. Treatment of intestinal toxemia is as important as any drainage of focal infections.
4. An alveolar abscess may be the focus from which the toxins are absorbed.
5. In the dietetic management of asthmatics, animal proteins, with the exception of buttermilk, should be eliminated from the dietary as much as possible.

DISCUSSION.

Dr. M. L. Graves, Galveston, Texas:—It seems a pity that Dr. Eustis was not allowed sufficient time to tell us what that dietetic treatment was. I personally should like to hear him outline the diet to which he referred, and if necessary, Mr. President, I would make a motion to that effect.

Seconded and carried.

(Dr. Eustis then read several pages of his paper which he was unable to do previously within the time limit allotted for essayists).

Dr. A. L. Levin, Harvey, La.:—I would like to ask Dr. Eustis whether the toxemia he speaks of as causing bronchial asthma, and by removing it curing the bronchial asthma, has any relation to the toxic albumen produced from proteids known as indican.

I have been much interested in that subject, and Dr. Eustis is interested in it, too. I read a paper six months ago on the subject before the Louisiana State Medical Society. Many writers have found heavy traces of indican in bronchial asthma, and I would like to hear from Dr. Eustis whether the toxemias of both are alike.

Dr. Robert B. Homan, El Paso, Texas:—I desire to endorse the statement of Dr. Eustis that the only true asthma is a bronchial asthma; that the reflex asthmas should be differentiated from the real condition from which they come and treated accordingly. However, I think a very important cause of true bronchial asthma was not touched upon by him, and consequently that kind of bronchial asthma would not be relieved by the dietetic treatment he suggests. I refer to the true bronchial asthmas which are caused by bacterial infection locally in the bronchial tubes. There is no doubt but what we have a true bronchial asthma which is caused by a localized infection in the bronchial tubes. That is proven in numerous cases by examination of the sputum. I grant you, there are numerous cases of bronchial asthma caused by dietetic errors and by fermentations mentioned by Dr. Eustis, but I do believe a large percentage of the cases of bronchial asthma may be relieved by proper treatment with autogenous vaccines or other preparations directed to the localized infections.

Dr. James C. Anderson, Plainview, Texas:—I lived for twenty-five years and practiced down in Central Texas. I have a son who is now twenty-one years of age and when three years of age he developed asthma. Of course, during this time I have seen many cases of asthma, and without making any special investigation as to the cause, I treated him as we usually do for the relief of the attack, but never found any great benefit from treatment. I have given my patients the iodid and other remedies, as I suppose most of you have, who have had many cases of asthma to deal with.

About eight years ago I decided to send my boy to a higher altitude, which I did for three summers. He improved. I changed my location and moved to the West. Since I have been there I have taken pains to meet the people who have gone there for asthma and have collected about fifty cases without resorting to any treatment whatever, as perhaps none of them had any specific treatment from any doctor. They are all benefited by the high altitude and most of them cured. I have had a few people tell me that frequently they would develop asthma from eating heavy meat meals. These attacks would come on in the night. Otherwise they would go for weeks and months without a symptom of asthma. Such remarkable cures from climate alone led me to believe that it must be due to an infection of the bronchial tubes by some specific germ, as we know tuberculosis is very materially benefited in a high altitude and semi-arid country, and that in itself had something to do with the cure and relief of these patients. It is simply horrible to think that a person cannot get some permanent relief. But if you take any of the cases and put them in a high altitude, in Colorado or in Texas, at an altitude of say from 3,000 to 6,000 feet, they will be materially benefited without any medication. The only disease of which I know we are free from, that the other portions of this association are exposed to, is perhaps malaria. We are entirely above the malarial line. We do not have any cases of malaria unless they be transported from a malarial district, and it is the only disease that I recall to mind that we are not exposed to just as much as those living on the coast country.

Dr. H. L. Wilder, Glen Rose, Texas:—Dr. Anderson has brought up a point that makes me rise because I endorse Dr. Eustis' views and his paper. It has been my observation that a number of people, whether they have asthma or not, who suffer from intestinal intoxications, can go to the west of Texas and be greatly improved. No doubt every man in the State has observed that point. There is probably something in the water; the water in the western part of Texas being different from that in the eastern part of the State. As we all know, water in the western part of Texas is hard, and people who suffer from intestinal intoxication and develop asthma can go west and become greatly improved.

I have known two or three patients in particular who cannot live down in this section of the country for any length of time, but they can go out

in the section I have referred to and be clear of indican and other intestinal putrefactive products that will appear in the urine. Acetone and diacetic acid have appeared in the urine in the cases that have toxemia that have come under my observation suffering from intestinal intoxication that is causing the asthmatic attacks.

Dr. Allan Eustis, New Orleans, La. (Closing):—Regarding the question of Dr. Levin, indican is representative of one of the many poisons formed in the intestinal canal. Where we find indican a certain amount of proteid material is undergoing putrefaction and the indican is simply an index of the amount of putrefaction. The indican itself is harmless.

Regarding local infections in the bronchi brought out by Dr. Homan, I did not maintain that intestinal putrefaction is the cause of all asthma. I have never considered it so. My oldest boy had asthma. He used to have violent attacks, and it was suggested that he go to a higher altitude, but I found it was not necessary. I claim that if you watch the diet and overcome the intestinal toxemia in these cases you will not have to send patients to a high altitude, but I do not mean to convey the idea that attention to the diet is the only indication.

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AN EXPERIMENTAL STUDY OF QUININ AND UREA INJECTIONS IN HYPERTHYROIDISM.*

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About three years ago I observed the effect of a concentrated solution of quinin and urea which I injected into an angioma of the tongue, that had been repeatedly cauterized with carbon dioxid snow without reducing its size or vascularity. Injections of a 50% solution caused the tumor to disappear completely; the tongue assumed its normal size and color and there has been no return of the condition since.

Shortly after treating the angioma, I used the quinin and urea injection in a severe case of toxic exophthalmic goiter. The patient was too ill to stand even the slight operation involved in ligating the superior thyroid arteries; the improvement following the injection was more decided than I have ever seen following ligation.

The use of injections of iodine, carbolic acid, alcohol, arsenic, iodoform and chromic acid are to be condemned because of their poisonous and corrosive properties and the liability of producing a thrombus

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if accidentally injected directly into the blood stream.

The harmlessness of quinin and urea intravenously is well known; in injecting vascular goiters patients have frequently told me that they tasted the quinin im-

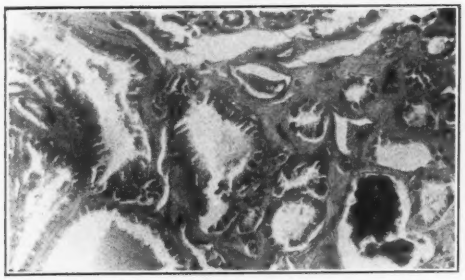

Fig. 1. Beginning degeneration of epithelium and stroma. The changes in the stroma occur earlier than those in the epithelium.

mediately after injection, and there has never been any unpleasant symptoms or pain when this occurred. In certain localities the use of quinin and urea intravenously is the treatment of choice for certain types of malaria.

EXPERIMENTAL STUDY.

From time to time in the course of this study it has been necessary to conduct a series of experiments. The dog's thyroid was selected because of its freedom from pathological changes.

The thyroids of several dogs were injected with different percentages of quinin and urea solution and removed at varying intervals of time to show the changes

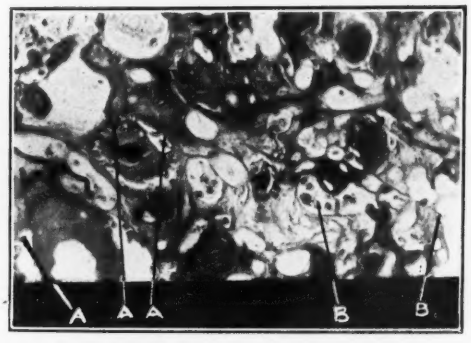

Fig. 2. Degeneration of epithelium in left half of section (A); in the right half necrosis has occurred (B).

that take place in the normal thyroid after injection.

All injections were made under ether anesthesia and the strictest aseptic technic was observed in every case.

The findings may be summarized:

The injection of weak quinin and urea solution has little effect. In three or four weeks the glands are practically normal in appearance, the destruction of thyroid cells and colloid always occurring after the concentrated solutions are injected.

The injection of concentrated solutions of quinin and urea into muscle produces an intense inflammatory reaction, resulting in the muscle being completely replaced by connective tissue.

CLINICAL STUDY.

In all cases of hyperthyroidism the necessity of minimizing pain from any in-

Fig. 3. Section of area showing complete necrosis of epithelium and degeneration of stroma.

jection by local anesthesia is of paramount importance.

I believe that injections into the goiter of a few minims of sterile salt solution, followed by injections of sterile water, given at one to three-day intervals, preliminary to the first quinin and urea injection, will raise the patient's threshold to stimuli, and is perhaps the best method of avoiding acute attacks of hyperthyroidism.

I have found that after two to four preliminary injections the nervous reaction is so diminished that the quinin and urea can be given with only slight discomfort and no increase in symptoms. As soon as there is no hyperthyroidal reaction following the water injections, their usefulness is at an end.

From a study of two human toxic goit-

ers removed for cosmetic reasons after injection, the following conclusions may be drawn:

In each of these cases there was a noticeable absence of adhesions around the

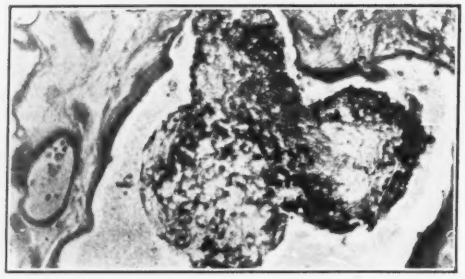

Fig. 4. Section at site of cyst showing complete necrosis.

gland; the operation was not made more difficult because of the previous treatment.

It is more difficult than one might suppose, to destroy a sufficient amount of thyroid to relieve hyperthyroidism, by injections through the skin.

The weak solutions of quinin and urea injected into thyroid tissue is productive of only a temporary fibrinous exudate, which is rapidly absorbed with more or less accompanying hyperemia; the reaction following the strong injection is more intense and results in extensive inflammation with round cell infiltration, connective tissue proliferation and necrosis of the thyroid cells with a loss of staining properties of colloid and thyroid.

I have observed that a number of small injections of quinin and urea produce more necrosis than a single massive infiltration.

CONCLUSIONS.

I have used quinin and urea injections for hyperthyroidism over four hundred times and the results may be summarized in the following conclusions:

1. The treatment is suggested only to relieve the symptoms of hyperthyroidism and is not recommended to remove the tumor in simple goiter.

2. The injection is a harmless procedure in experienced hands; it should be used only in a hospital by men skilled in goiter work. It is almost painless, and there is no post-injection discomfort.

3. Small infiltrations, frequently repeated, are to be preferred to massive ones.

4. If the injections are always made well within the thyroid, there will be no adhesions around the gland and operation will not be made more difficult because of the previous treatment.

5. The injection of a weak solution of quinin and urea has little effect, necrosis and connective tissue formation always occurring after the concentrated solutions are injected.

6. In treating toxic goiter the necessity of preventing pain from any injection, by the use of local anesthesia, is of vital importance; if acute attacks of hyperthyroidism are to be prevented, the use of preliminary injections into the most prominent portion of the goiter of a few minims of sterile salt solution, given at one to three-day intervals, followed by injections of sterile water, will be found indispensable; the result of the quinin and urea injection depends on the amount of tissue destroyed.

7. I believe the greatest field of usefulness for the injection will be found in

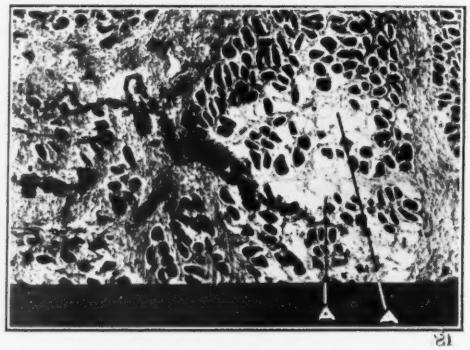

Fig. 5. Muscle of dog after injection with concentrated solution of quinin and urea. Extensive connective tissue infiltration. Necrosis of muscle at A.

those cases of beginning hyperthyroidism not severe enough to justify operative treatment, and as a preparatory measure to partial thyroidectomy in chronic cases of toxic goiter too ill to warrant any form of immediate operative procedure.

I wish to thank Professor Turley of the University of Oklahoma for the valuable assistance in preparing the microscopical sections used in this paper.

RELATION OF THE EYE GROUNDS TO THE WORK OF THE INTERNIST.*

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The subject of this paper was suggested by a discussion that took place, not long ago, between a colleague and myself. The doctor, whose practice is limited to diseases of the eye, ear, nose and throat, had been reciting the history of a case referred by a good general practitioner. This patient's only complaint was a not very marked failure of vision, and the family physician, attributing the trouble to an error of refraction, had referred the case to the specialist. This diagnosis proved to be entirely incorrect, for examination of the fundus oculi revealed the presence of a typical albuminuric retinitis, and subsequent uranalysis confirmed the specialist's diagnosis of Bright's disease.

Such errors, though, fortunately growing less common, are attributable to the enormously rapid growth of medical knowledge. Medicine, as a science, is comparatively young. Facts and theories are accumulating with great rapidity. In the laboratory and at the bedside trained workers are busily studying the phenomena of disease. Their contributions are so voluminous that one finds it impossible to keep abreast of them. Indeed, a glance at the index of any one of our better professional journals will soon convince one of the futility of such an attempt.

This condition has brought about a division of the science into a number of more or less artificial groups, apparently distinct, but so closely interrelated that complete knowledge of any one is largely dependent upon at least partial mastery of certain of the others. The pathologist whose work is to be of more than academic interest must know something of the clinical aspects of the conditions he is called upon to diagnose. The neurologist, in the presence of a case of cerebral syphilis, must recognize the central nervous lesion as a single element in the clinical picture of a constitutional disease, and treat it as such, if he wishes his therapy to be of any avail; and the internist must not forget that, in some of his cases, the examination of organs that belong to the domain of the specialist may give him just the clue for which he has been looking.

To the internist there is, perhaps, no more interesting relation than that which is found to exist between some of the constitutional disorders and certain pathological changes in the fundus oculi. If the eye is the mirror to the soul, it is in no sense less true that it is the mirror to many grave constitutional diseases. The retina of the human eye is one of nature's most delicately adjusted organs and any impairment of its nutrition, whether it be through the elaboration of toxic substances or mechanical interference with its blood supply, will, sooner or later, become manifest in easily visible changes.

If, then, there are so many conditions that affect the normal appearance of the fundus, the importance of knowing just what they are, and some of their more typical associated changes, becomes easily apparent. This fact is so well recognized that, in most of the large Eastern hospitals, eye ground examination is fast becoming a routine measure in the diagnosis of cases of coma where no history is obtainable. Permit me, at this point, to cite an illuminating case. This patient, a man of about forty-five, was brought into the hospital with no other history than that a police officer had found him lying unconscious on the street. There was little evidence of external injury; pupils were irregular and dilated, arteries soft, blood pressure very high. A catheterized specimen of urine was sent to the laboratory for analysis, and while waiting for the report a fundus examination was made by the house physician, who found a typical choked disk. In the meantime the urine had been found free from albumin casts or sugar. A tentative diagnosis of fracture of the skull was made. A little later a projectile vomiting appeared. Subsequent autopsy proved the correctness of the diagnosis. There are not a few cases of chronic kidney involvement in which the presenting symptom is a failure of vision, and, in certain rare instances, the presence of diabetes may be revealed by urinalysis done at the instance

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of the oculist. To those whose interest in a case ends when they have gathered barely enough evidence to justify a diagnosis, all of this means but little. To those who look farther than a mere diagnosis, who wish to see every manifestation of a particular disease, there is no organ of too little importance to merit their attention. Such men will never tell an elderly patient with failing vision to "go get some specs," but, even though they be unable to use an ophthalmoscope, will keep in mind that this symptom may be the first warning of some grave constitutional disease. To sum up, then, no case of failing vision should be allowed to leave the internist's office without having been at least questioned as to the presence of a possible constitutional cause.

For the purposes of this paper it is best to classify the diseases that may be complicated by changes in the fundus, as follows:

I. Intoxications.
  1. Arterio sclerosis.
  2. Albuminurias.
    a. Nephritic.
    b. Gravidic.
  3. Diabetes.
  4. Leukemia.

II. Infections.
  1. Syphilis.
  2. Miliary tuberculosis.
  3. The meningitides.

III. Diseases Acting Through Mechanical Interferance with the Blood Supply.
  1. Acute conditions.
    a. Fracture of the skull with hemorrhage.
    b. Cerebral apoplexy.
  2. Chronic conditions.
    a. Neoplasms.
    b. Gummata.

In arterio-sclerosis, it is the retinal vessels that are the first to become affected. They are usually very markedly thickened before any discoverable change in the peripheral arteries takes place. The diagnosis of very early cases is usually made by the oculist, who discovers the condition during his routine examination of the fundus.

One of the most striking forms of secondary intraocular change is the so-called albuminuric retinitis. It is practically always associated with the chronic forms of nephritis, and of these the interstitial variety is its most frequent cause. Acute Bright's disease is very rarely complicated by retinal involvement. So true is this that, according to Osler, a case presenting the clinical picture of acute nephritis is, when complicated by the typical albuminuric fundus, more likely to be an acute exacerbation of a previously undiscovered chronic Bright's disease. It might be well to remark at this point that the severity of the retinitis bears very little relation to the severity of the kidney disease, a very mild type often accompanying severe lesions, while almost total blindness may be found in association with comparatively mild involvement of the kidney. Nephritics are also occasionally subject to a disturbance of vision that is not accompanied by any visible change in the retina. Everything suddenly grows dark before the patient's eyes, and in from a few hours to a day complete blindness may supervene. Coincidentally with the loss of sight other uremic symptoms become manifest, and as they clear up sight is gradually restored to normal. At no time during the course of the disturbance can any change in the fundus be found. This is the so-called uremic amaurosis or amblyopia.

The nephritis of pregnancy is also occasionally complicated by a fairly typical retinitis, which, though differing in many of its characteristics from that which complicates the primary kidney lesions, is, nevertheless, a true albuminuric form. The usual history of such a case will run about as follows: Pregnancy has advanced with but little trouble until the latter months have been reached. At this time the patient begins to notice that objects look just a little bit blurred. The failure of vision is progressive and ceases to grow worse only with the birth of the baby. Unless delivery is prompt, total blindness may result. The seriousness of the condition, as far as sight is concerned, depends upon the stage of pregnancy at which onset occurs; if it be during the early months, sight is more likely to be destroyed than if it occur later on. The moral is obvious. Complaints as to vision in pregnant women should call for immediate skilled examination of the fundus and, if a retinitis be present, delivery or even abortion must be seriously considered.

The presence of albuminuric retinitis is not without some prognostic signifi-

cance. In this connection one must not forget the relation of the fundus change to the stage of the disease, i. e., its comparatively early appearance in the albuminuria of pregnancy and its late onset in the pure nephritides. Of the latter, Osler says: "The prognosis in such cases is, on the whole,grave." The older writers agree with this view, Thorington giving the expectancy of life as about two years, though he admits that this rule has many striking exceptions. Later authorities are by no means so pessimistic, some even going so far as to claim that predictions as to longevity based upon changes in the fundus are practically worthless. The truth, no doubt, lies somewhere between these two extremes. The retinitis of pregnancy does not indicate a bad prognosis as to life.

When we come to the consideration of diabetes mellitus we find that fundus changes are the least common of its ocular complications, the most frequent being bilateral cataracts, which may occur at any age. Diabetic retinitis was first described by Yaeger in the year 1856. It is fairly characteristic. At times, however, this retinitis may take on the appearance of some of the other types, as the albuminuric. Diagnosis can seldom be based on the appearance of the fundus alone, and it is important to us only as one of the possibilities to be considered in any case where the presenting symptom is a failure of vision. In diabetes as in nephritis, attacks of amblyopia may occur.

Leukemia is much more frequently complicated by retinitis than is diabetes, Osler having demonstrated it in about ten cases out of a series of seventeen. The appearance of the fundus is so characteristic that a diagnosis can frequently be made with the ophthalmoscope alone. This disease is so rarely met with in the average Southern practice that further discussion is not necessary here.

Of the infectious diseases in which intraocular changes occur syphilis is, by far, the most important. And its manifestations are numerous. No structure within the eyeball is immune. The cornea, the iris, the lens, and even the humors of the eye may suffer. The retina and optic nerve are often badly damaged; and, for the sake of consistency, discussion will be confined to them. As to the characteristic appearance of the syphilitic fundus, there is no such thing. Its pathology embraces a variety of changes, from a simple neuroretinitis to a disseminated choroiditis, and even atrophy of the optic nerve. It is the protean character of these changes that leads the oculist to suspect the presence of syphilis. The so-called primary optic atrophy, though of comparatively rare occurrence, is of the greatest possible importance. It is nearly always found associated with the Argyle-Robertson pupil, and, with that sign, is often the first clinical manifestation of an oncoming tabes dorsalis. Such a case, when reported by the oculist, should be given the benefit of laboratory examinations of both blood and spinal fluid with a view to determining whether a central nervous lesion is present.

Miliary tuberculosis may be complicated by the formation of deposits in the choroid coat of the eye. Occasionally these little tubercles form a basis for the differentiation of miliary tuberculosis from some of the other diseases which it may resemble. I have been fortunate enough to have seen one such case and will, with your permission, briefly describe it here.

This patient was a negress about seventeen years of age Family history unimportant. About two months before admission she had "caught a cold," began coughing, lost weight, had some fever in the afternoon, and presented generally the appearance of a fairly severe case of early pulmonary tuberculosis. Four days before admission the patient complained of feeling very ill, and the temperature rose rapidly to a high level, which it maintained during the balance of the patient's life. The face presented that dull, apathetic appearance so characteristic of typhoid fever. In fact, after admission to the hospital the case assumed many of the characteristics of that disease. The laboratory findings, however, did not fit in so well with typhoid fever. There was a slight leucocytosis, while the blood culture and Widal reaction gave negative results. The diazo reaction was positive. On the basis of the previous history and the laboratory findings, a diagnosis of acute miliary tuberculosis was made. This diagnosis was confirmed by the demonstration of choroidal tubercles, and further confirmation was added by the autopsy, which took place two weeks later.

In the little outline given above, I have included the meningitides. The associated fundus changes are of so little value either in the diagnosis or prognosis that it would be useless to discuss them here.

Up to this point we have been consider-

ing only those conditions in which the perversion of ocular nutrition and the consequent changes have been due to the presence of deleterious substances in the blood stream itself, and whether these substances have been elaborated by the body cells or by infectious agents, the trouble has been due to the quality of the nutrition rather than any lack of a proper amount.

We now come to a consideration of those conditions which produce their effects through mechanical interference with the circulation, and while it may seem that some of them are more properly surgical diseases, they so frequently come to the internist for diagnosis that it may be well to mention them here.

There are two types of cases in which the stoppage of the blood supply is due to causes acting over very short periods of time. These are cerebral apoplexy and fracture of the skull accompanied by hemorrhagic extravasation. Both of them produce their effect by a sudden outpouring of blood into the cerebral cavity. Intracranial pressure is markedly increased; pressure on the retinal vessels, especially the vein, retards the flow of blood. Congestion followed by edema of the optic nerve takes place, and the picture described in the text books as choked disk quickly makes its appearance. Differentiation between these two conditions can not be based upon ophthalmoscopic examination.

Tumors of the brain constitute the most striking example of the ophthalmoscope as a diagnostic instrument. In this group of diseases the process of development is very slow. A long time may elapse before definite pressure symptoms become manifest. Changes in the fundus usually take place before any other clinical sign can be found. The typical early lesion is the choked disk referred to above. So frequently is a choked disk found as the first clinical manifestation of a brain tumor that its presence should at once focus the attenion on the possible existence of such a condition. In this connection, permit me to quote from Fuch's Text-Book of Ophthalmology: "Neuritis, in this case, is so frequent—it is said to be wanting in only 10%, according to others in 20% to 30% of cerebral tumors—that it forms one of their most important symptoms. This symptom is the more deserving of consideration inasmuch as a cerebral tumor may run its course for a long time without producing any other positive symptom, e. g., it may simply cause headache, or even this may be wanting." As time goes on the edema and congestion of the fundus gradually disappear and give place to a more or less typical atrophy of the optic nerve. Gummata may produce a similar train of symptoms, though more often other syphilitic changes are also demonstrable.

A little thought on what has gone before soon brings one face to face with the question as to whether the internist should make such ophthalmic examinations as the exigencies of his practice may indicate. The answer involves the consideration of two points—one as to his ability to acquire the requisite knowledge, and the other to the availability of the specialist. As regards the first of these points, the knack of using an ophthalmoscope is not difficult to acquire and there are many changes in the fundus which, when once seen, are difficult to forget. It must be remembered, on the other hand, that many internal diseases are complicated by changes that are not so characteristic, and the nicety of judgment required for the recognition of such cases can be acquired only by years of intensive study. Where expert assistance is not so easy of access as it is in our larger cities, the ophthalmoscope may help the general practitioner out of a great many difficulties. As a rule, though, it is best, whenever possible, to refer such cases to the specialist, and it is for this reason that minute descriptions of ophthalomoscopic pictures have been so studiously avoided.

The purpose of this paper has not been to present a lot of new facts. Every one of the diseases referred to is well known to the average general practitioner. This is an age of intensive specialization, and in the pursuit of special knowledge one runs great risk of losing his perspective. It is well, therefore, occasionally to pause and pick up some of the threads that connect our own special work with other branches of medicine. And if my paper, meagre and incomplete though it be, shall in some measure emphasize this fact, it will have served its purpose well.

DISCUSSION.

Dr. H. R. Levy, Dallas, Texas.—Very often a man comes to our office complaining of some digestive disturbance, some dizziness, or a little disturbance of vision. When a patient does not appear very sick or complain much, the general practitioner will often overlook the fact that there may be a more serious trouble than that of which the patient complains. He is inclined to give a prescription, examine the urine and make a diagnosis of Bright's disease or whatever the condition may be, and be satisfied. The man who understands the use of the opthalmoscope better than we do is generally the man who can give us more of an idea as to the advancement of the disease aside from the microscopic findings in the urine and blood pressure. In my experience I recall several cases like this where a man has been sent by an oculist to the general practitioner to find out what was the matter with him; he complained he could not see very well at night and while looking at his papers on the desk he found that his vision was blurred. He went to the oculist first and the oculist told him to consult the general practitioner. If an oculist knows his business and realizes that there may be pathology in the fundus or retina, he will know that there may be destruction going on somewhere else, and the use of the ophthalmoscope is very important in the hands of any one who has been trained to use it. Unless the general practitioner has had a thorough training, I do not think we should take the responsibility of taking his word for it. There are certain conditions that can not be diagnosed accurately without an ophthalmoscopic examination. We should all take home the lesson from this paper that the ophthalmoscope is a very important instrument to tell us what is going on besides the microscopic findings in the urine. There is no question whatever, from the standpoint of the general practitioner, that we ought to realize its importance, and the sooner we do so our patients will get the benefit of it.

Dr. L. F. Parker, Baltimore, Md.—This matter of looking at the eye grounds by the general practitioner is, it seems to me, so important I should like to say a word or two about it. Undoubtedly one may look at many eye grounds before finding one that shows anything particularly abnormal, but "catching" that one, now and then, is worth while. An opthalmoscopic examination is such an easy test to make, even by the general practitioner, that I think it would be wise to have one made of every patient as a routine. The reason why it is not done, I believe, is because general practitioners have not always found it easy to learn the indirect method of ophthalmoscopy, and that method is not easy. The introduction of the electrical ophthalmoscope has made direct ophthalmoscopic examination very easy. The difficulty, up 'till recently, has been that the electric current was not always available in every house in which we want to make an examination, and that battery that could be carried around was so cumbersome that practitioners failed to take it with them. It was too much of a bother.

There is now available an electrical ophthalmoscope so small and so portable and so easy to use that any one can have it in his bag and can apply it anywhere, even in the darkest corner of a tenement house. A first-year student with this instrument can see the eye grounds and optic disks and retinae with the greatest ease. Many of you are doubtless familiar with the use of this instrument, but I have been surprised to find how many physicians do not know about it, and therefore I have thought it worth while to show it here.

It is this little ophthalmoscope (showing instrument) that every ophthalmoscopist is familiar with and most consultants know, but that is not yet widely enough used by general practitioners. The battery is in the handle; a new battery costs about 35 cents when the old one is exhausted. All one needs to do is to turn a switch and the light is on. One looks into the eye by direct examination and can see the eye grounds in a moment. Not every general practitioner can be expected, of course, to make use of all the refinements of diagnosis in the eye grounds that are possible for an expert; that is unnecessary, but he can quickly learn to recognize a choked disk, a hemorrhage, or an albuminuric retinitis. He will see these at once if they are present. If he notices, furthermore, anything unusual in the eye grounds, he should refer the case to a skilled ophthalmoscopist for a full report.

I think a brief experience with routine ophthalmoscopic examinations would soon impress upon the average doctor the importance of looking at the eye grounds more frequently than he now does.

Dr. G. C. Lechenger, Houston ,Tex. (Closing).—I do not know that I can say very much more after what Dr. Barker and Dr. Levy have told you, except to say I am very glad to have heard Dr. Barker make the point as to the use of the ophthalmoscope by the general practitioner. I have one, fortunately, and never miss an opportunity of looking into the eye grounds, when the patient will allow me to do it, and I find that patients very seldom refuse me that permission.

THE ETIOLOGY OF PELLAGRA WITH ESPECIAL CONSIDERATION OF THE PHENOMENA OF SENSITIZATION TO MAIZE AND SUGAR-CANE PRODUCTS.*.

By Roy Blosser, M. D.,
Atlanta, Ga.

I wish to state first of all, that I do not blame granulated sugar with having anything to do with the production of pellagra. Neither do I blame carbohydrates as a class, but only those particular deriva-

*Read at the Third Triennial Meeting of the National Association for the Study of Pellagra at Columbia, S. C., Oct. 21 and 22, 1915.

tives of sugar-cane and maize which are mentioned later.

I claim that certain products of sugar-cane contain an active poison, and that all that is necessary for the development of pellagra is the consumption of a sufficient quantity of these poisons. A generous diet of meat and other proteins can no more prevent pellagra than it can prevent the development of alcoholism in the regular drinker. The moderate consumption of proteins foods is advantageous in the treatment of pellagra, but the giving of too much proteins or of too little carbohydrates is necessarily injurious.

Some writers claim that it is best to entirely eliminate carbohydrates from the diet, meaning perhaps, sugars and sweets. *They allow such foods as vegetables, bread and milk, all of which are largely carbohydrate,* the latter containing 4 per cent. of sugar.

In previous papers I have called attention to facts indicating that pellagra in the South is due to the consumption of either maize or sugar-cane products, or both. In the present paper I wish to discuss the probable role played by sensitization to these food products in the development of the disease.

My claims as to the pellagra-producing qualities of the non-refined or partially refined sugar-cane products are based on: (a) A careful study of the dietetic habits of more than two hundred pellagrins; (b) The results obtained in such cases by the exclusion of certain articles of food; (c) The effect of the experimental administration of these products to dogs. These experiments have differed from other attempts to produce pellagra experimentally in that meat and other foods were given with the sugar-cane ration, thereby eliminating any question as to the results being due to a lack of vitamines, or to an unbalanced or unnatural diet.

In one experiment a puppy (No. 1) was fed granulated sugar, mixed with a varied diet, for a period of six months[1]. From the absence of any apparent harmful effect in this animal and from my clinical observations in people, I have exonerated granulated sugar from any etiologic part in pellagra.

During the same time another puppy (No. 2) was fed in the same way except that, instead of the sugar, a corresponding amount of sugar-cane sirup was added to the food. Dog 2 did not develop properly and was weak and flabby as compared with Dog 1. On autopsy Dog 2 showed necrotic areas in the intestines; a beginning intralobular cirrhosis of the liver; swollen, granular and blurred epithelial cells of the tubules of the kidneys. The sirup used in this experiment was what is known as a mixed sirup, containing between 80 per cent. and 90 per cent. of glucose.

In another experiment a half grown dog was fed a cheap, refinery sirup, that is, one which had not been diluted with glucose[2]. A moderate amount of meat and other foods were also allowed. There developed, in about three weeks' time an erythema of the legs and tail; there was swelling of the legs, and, apparently, tenderness of the feet; also, a moderate degree of diarrhea. The dog often swayed from side to side as though dizzy. There was pronounced photophobia. Weakness and emaciation progressed rapidly and death occurred at the end of the tenth week. The total amount of sirup taken during the ten weeks was less than one gallon, an average of one and five-sixths of an ounce a day. The principal macroscopic changes observed at autopsy were:

A large, yellowish-gray liver; catarrhal enteritis; duodenal ulcers; nephritis.

It was felt that the actions and appearances of the dog, including the skin lesions and the post-mortem disclosures, showed a strong resemblance to pellagra.

The comparative modernity of pellagra in this country is accounted for by the coincident change in the method of refining sugar whereby large quantities of cheap sirups—concentrated extracts of sugar-cane—have been thrown on the market. *The consumption of all sugar-cane products in this country has doubled during the last fourteen years.*

The greater prevalence of the disease among poor people is ascribed to the fact that these concentrated sirups, either as such or made up into candies and cakes, are the cheapest sweets obtainable and are largely used by poor people to take the place of more expensive foods.

The great prevalence of the disease in the South is explained by the fact that sugar-cane is grown in this section and is naturally more freely eaten and has been

in use for a longer time than in the North. The effect of sunlight (Raubitschek[3]), or its action on the red blood corpuscles (Hausman[4]), or the debilitating effect of residing in a warm climate—one or all of these are probably important contributing factors.

The yearly exacerbations of the disease could possibly be accounted for in one or both of the following ways:

(1) The untoward effects of sugar-cane consumption are more marked during warm weather than during cold.

(2) It appears that people eat more of these sugar-cane products during the spring than at any other time of the year. I have been told by a few pellagrins that they seemed to crave such foods in the spring, and several grocers in pellagrous sections have stated that they sold more of them at this time of the year than at any other.

In some cases the consumption of maize is the main factor in the production of the disease. Those who deny this have not, I believe, given sufficient attention to the work of French and Italian pellagrologists. Pellagra does not result from a moderate consumption of maize, but only from the extreme consumption, as practiced by Italian peasants. Since there is little, if any, poverty in the United States comparable to that in Italy, we do not here find this extreme consumption of maize. For this reason and also because we find typical cases of the disease in persons who have never eaten maize, the consensus of opinion among American students of the disease does not favor the maize theory as an explanation of the disease in this country. The only position which, to the writer, seems tenable at the present time is that there is, in this country, another and more active cause of the disease than maize.

Theories in opposition to the maize theory have generally been based on the negative fact that cases of pellagra occur in individuals and in countries where maize is not eaten.

SENSITIZATION TO SUGAR-CANE.

A late stage in the development of the sugar-cane habit is the stage of sensitization and has not been previously described. I have observed this condition in nearly all advanced and chronic forms of pellagra. Most commonly, in my experience, the habitue notices, first, that sugar-cane products cause a burning sensation of the tongue, esophagus or stomach; there is also palpitation of the heart and nervousness. As in alcoholism, he craves the stimulation, but the knowledge of the unpleasant reaction which will follow causes him to indulge his appetite less and less. At a later stage, particularly following a period of abstinence, a small amount of sugar-cane product will cause a severe gastro-intestinal upset. Therefore, it is not rare to find that such an individual has apparently eliminated nearly all sugar-cane products from his diet, but the small amount used is sufficient to cause more harm than the larger amount used at first, and therefore we find a steady impairment of health and increase of the pellagrous symptoms.

PECULIARITIES OF MAIZE AND SUGAR-CANE SENSITIZATION

(1) The development of sensitization appears to be more typical in those who have first used these foods quite freely and have then discontinued them for a time. Those who are accustomed to using them regularly without being aware of any harmful effect, will, after a period of abstinence, note that a small amount produces marked symptoms.

(2) All chronic and advanced cases of pellagra have, in my experience, noted for themselves the unpleasant effects following indulgence in sugar-cane products and have largely excluded them from their diet, despite the fact that they crave them as much as ever.

(3) The development of sensitization appears to require a certain time after the appearance of the earliest symptoms of pellagra. In acute cases of short duration it has not been observed.

(4) The reaction is more marked in warm weather than in cold. In this connection the photodynamic theory of Raubitschek[3] is of interest. Also the work of Hausman[4] on the photodynamic action of hematoporphyrin, a pigment derivative of red blood corpuscles. The possible relation of this latter form of sensitization to the development of pellagra does not appear to have been recognized, but inasmuch as the reaction includes skin lesions and subcutaneous edemas, its consideration is interesting in this connection.

(5) Sensitization may be inherited. An example of this is the case of a boy whose mother is pellagrous and who has, all his life, been so sensitive to all sugar-cane products that a small amount upsets his bowels and causes various other symptoms.

In nearly every case where the parents are pellagrous I find that their children either show an abnormal appetite for sugar-cane products or else they are so sensitive to them that a small amount upsets their bowels. Many of the latter class die during the first year.

(6) Sensitization appears to be interchangeable, that is, one who has become sensitized to maize will also react to sugar-cane, and vice versa.

SENSITIZATION TO MAIZE PRODUCTS.

The occurrence of sensitization to the ingestion of maize products in cases of pellagra appears to be a well established fact, but one which has received very little consideration by American investigators.

Marie[5] mentions "recrudescences of pellagra with grave symptoms when the convalescents return to nourishment with corn, even when the corn consumed answers to the most severe hygienic demands."

Bass states[6]: "There is abundant evidence that one poisoning by spoiled corn renders the patient hypersensitive to a subsequent dose—very small quantities of the toxin such as are present in apparently sound corn may produce the disease."

One patient of my own who had for more than four months been on a strictly maize-free and sugar-cane-free diet developed a severe gastro-intestinal upset with marked prostration after eating about a tablespoonful of canned corn.

Recent investigators have explained this reaction as being a form of anaphylaxis. Gosio[7] claims to have recovered a definite chemical compound from spoiled maize; this poison, he states, is a result of parasitic growth, belongs to the class of phenols, and is of an anaphylactic character.

Volpino[8] isolated from spoiled maize a substance which he named pellagrogenin which caused hypersensitiveness when injected subcutaneously into pellagrous patients. This reaction, he stated, occurred in 90 per cent. of pellagrins and 20 per cent. of non-pellagrins, the latter being due, probably, in part to sensitization as a result of a maize diet and in part to latent pellagra.

Nitzescu[9] claims that the maize albumen, zein, causes the formation of protective ("zeinolytic") ferments in the blood; this allows, he asserts, early detection of pellagra by serodiagnosis, as instanced by cases giving positive reactions in which only gastro-intestinal symptoms were present. In 58 pellagrins the reaction was negative in only two cases, and these had not eaten maize for more than two years.

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ACCIDENTAL DISCOVERY OF A POSSIBLE CURE FOR PELLAGRA.

By W. F. Cole, M.D.
Waco, Texas

In the spring of 1915 a lady from a near-by country village stated to me incidentally that three of her children had been affected with round worms and with pellagra at the same time, and that she gave them vermifuge for the worms and, very much to her surprise, they were entirely cured of the pellagra as well as relieved of the worms, which were removed in large quantities. She stated that two children of neighbors were also cured in the same way of pellagra. She stated that she did not know the nature of the vermifuge, merely stating that it was a worm medicine which she obtained at the drug store, and that she gave castor oil

following the vermifuge. This woman was firmly convinced that pellagra is caused by round worms, and she boasted that she could cure any case of pellagra. This woman's theory appealed to me as being fully as rational as the dietetic theory, or rather as irrational, because stinted diet and round worms have been common in all ages and climates, while pellagra has been confined almost exclusively to warm climates, whereas round worms and stinted diet have been the portion of the poor in every age and in every part of the earth. I suspected that this woman had unwittingly effected a cure by sweeping out the intestinal tract and freeing it of the pellagra germs along with the round worms, and since the germ is most likely a protozoa, the worm medicine might have been effective. I suspected that she had used santonin and possibly in combination with calomel.

HOW A CASE GIVEN UP AS HOPELESS WAS CURED.

I saw this patient on August 10, 1915. He was eight years old. His father had died of pellagra in November, 1914, after a lingering illness of eighteen months. The mother became affected with the disease before the death of the father, but her case was mild and she recovered in a few months. The boy was affected with a pleuritic abscess in the spring of 1914, and a section of rib was removed for drainage. He apparently recovered from this till February, 1915, when he received an injury while at school and the wound reopened, and became a running fistula till the following November, and will be referred to later. In April, 1915, he became affected with a most virulent type of pellagra, and all hope of recovery had been abandoned for some time before I saw him. He was receiving no treatment at the time and I took the case with the understanding that the treatment would be experimental and medicine and services given without charge.

In appearance a more hopeless case could scarcely be imagined. He looked more like a mummy than a living being. He was practically a maniac and screamed with fear when I approached him, and his eye glittered with terror like those of a trapped wild animal when I approached him, and he tried to hide himself. His little legs and feet were almost covered with bloody scabs where he had scratched on account of the persistent itching. Desquamation had occurred wherever the skin had been exposed, and it had that red glazed appearance such as follows a burn. The skin where desquamation had not occurred was the color of ashes. His bowels moved several times daily and the stools were intermixed with much mucus and some blood. His temperature was one and a half degrees up.

I gave him calomel and soda three grains each together with santonin one grain, to be given at bedtime and followed with castor oil in the morning. This to be repeated the following night and morning. On the first morning no round worms were found, but the faeces were literally alive with motile intestinal bacteria, appearing under the microscope, indicating a very polluted and unclean condition of the intestinal tract, such as found in typhus and typhoid fevers. The blood in the stools was seen no more after the second day and his general condition began to improve immediately. I had the mother give medium doses of calomel and soda at frequent intervals for several weeks, followed with oil. His nervous symptoms persisted longest and reached a crisis in November, when he became partially paralyzed for several days, and, strange to say, when he recovered from the paralysis the running fistula healed over and he entered on a period of rapid convalescence without interruption. I forgot to state that his stools, for some time after he began to take the medicine, contained large pieces of mucous membrane, probably desquamated from the colon.

CONCLUSIONS DRAWN FROM MY INVESTIGATIONS, AND FROM THE OBSERVATION AND STUDY OF THIS CASE.

I am fully convinced that pellagra is a typical infectious epidemic germ disease, peculiar to warm climates just as are malaria and yellow fever. I suspect that the germ is a protozoan similar to the plasmodium of malaria. I am quite sure that it is not contagious and that the infection enters the system by way of the digestive tract.

I believe that it is primarily an intestinal disease developing enormously there before entering the circulation by way of the lymphatics or lacteals. It probably attacks at an early period the liver, pancreas and other glands, thereby crippling the functions of metabolism and the chemistry of the body, causing profound derangements of the digestive and nervous systems.

TREATMENT INDICATED.

Since the intestinal tract, particularly the colon, becomes the breeding ground for the germs before they enter the general system, and from which those in the circulation are constantly recruited, the rational treatment therefore would be to sweep out the intestinal tract and make it as nearly aseptic as possible and keep it so. Since the bile is nature's great antiseptic the liver should be stimulated. For this there is nothing better than calomel, which is not only a cathartic but one of the very best of all systemic antiseptic

drugs. If the germ is a protozoan the santonin might be a specific as indicated in the case mentioned. Therefore the treatment as reported in this case seems rational, to be given at the discretion of the physician. Castor oil should be given after the calomel in all cases, and at other times I have found liquid paraffin an excellent mechanical laxative. Besides no germ, either animal or vegetable, will live in it. I submit this paper to the consideration of the medical profession, hoping that the experiments and suggestions may be of value in helping to eliminate the scourge of pellagra from the South.

Author's Note: The above paper was written in December, 1915. It is now the month of April, 1916. I beg to observe that the patient referred to has exhibited no symptoms of recurrence. I believe that every one will agree with me that pellagra has been absolutely quiescent during the whole of the winter months throughout the country. So far as I can learn not a single new case has developed anywhere in the South. I expect that it will become epidemic with the coming of the summer when it will be carried probably by the house fly. All the history of the disease indicates that its permanent habitat is only in warm climates, where the summers are long and the winters short. Sporadic cases have occurred in some of the Northern states, but only in the summer months. I am quite sure that it is primarily an intestinal disease, entering by way of the digestive tract, and probably locating permanently in the colon, from which the germs pass into the circulation. If an unbalanced diet were the cause we should expect the disease to rage in the winter as well as summer, in fact the diet in winter is not nearly so good as it is in summer when fruits, vegetables, milk and eggs are more abundant. So far as I know it has not appeared as an epidemic in any part of Northern Europe, not even in Belgium, Serbia or Poland.

Notwithstanding that the diet of the people in the Southern states has varied little or none during the past one hundred years, nothing resembling pellagra was ever known till some ten years since. It has been called the poor man's disease because it is far more common among the poor. In the city of Waco it has been confined almost exclusively to those parts of the city where open closets are the rule, and where the cottages are not well screened. It has raged among the Negro population in the Brazos bottoms who dwell in cottages without screens and where even closets of any kind are the exception. I believe that all classes of the poor people of Texas are better fed today than at any time in the history of the state, hence I contend that the disease is not due to an unbalanced diet.

AUTHOR'S ABSTRACTS

Medicine.

Roentgen Ray Treatment of Exopthalmic Goiter. By C. Augustus Simpson, Washington, D. C. Medical Record, September 4th, 1915.

Recent statistics tend to show that a large percentage of cases of Graves disease are complicated with enlarged thymus glands. Simmonds says 70%. Most foreign surgeons attribute dangerous postoperative symptoms or death to this complication and advise resection of the thymus gland either before or at the time the thyroid is removed.

Friedlander's work on the X-Ray in cases of status lymphaticus in infants led me to apply the same treatment to exopthalmic goitre and enlarged thymus glands. Many cases are on record which show that the ray when applied to the thyroid in Graves disease not only lessens the symptoms but has even gone to the point of producing symptoms of myxoedema. The action of the ray on the thymus is even more marked than it is on the over-active thyroid. The results with this treatment in some cases have relieved symptoms where two and three operations have failed. All cases show improvement in either pulse, weight, sleep or nervousness, the pulse being first to improve. The exopthalmus is the last symptom to disappear and in some cases has persisted in spite of the most intense treatment. Measured, massive doses of ray, 5 H filtered through 1mm of aluminum are given over the thyroid and thymus every two weeks; six such treatments being given.

As a rule improvement is seen after the second or third treatment. Cases continue daily duties and take no drugs. It is certainly to be the method of treating exopthalmic goitre in the future. It is impossible to say which cases will best react with the ray.

Even when thymus gland is totally absent exposing the thyroid gets a good result.

Neisserian Proctorrhea. Charles C. Mapes, Louisville, Ky. The Urologic and Cutaneous Review, January, 1916, p. 23.

Gonorrhea simply means "a flow of semen." Gonorrheal endo-, myo-, or pericarditis signifies a flow of semen from the heart; gonorrheal encephalitis, a flow of semen from the brain, etc.

Neisserian is suggested as not only scientifically exact but a technically and anatomatically correct description of such affections.

For several years after the discovery of the Neisserian diplococcus it was the impression that the rectal mucosa were immune to its invasion, but it is now known that the rectum is not infrequently invaded.

Neisserian proctorrhea may be either primary or secondary, acute or chronic, and the contagion may be acquired in various ways. In adults it may be inadvertently conveyed to the rectal mucosa through mediate contact, but also through immediate contact by pederasty. In adult females

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TROPICAL DISEASES AND PUBLIC HEALTH

THE NEGRO A MENACE TO THE HEALTH OF THE WHITE RACE.*

BY MARVIN L. GRAVES, M.D.
Galveston, Texas

The morbidity and mortality of disease are important indices of the intelligence and education of a people. It was Gladstone who said that the health of the people was the first concern of statesmen. Recognition of responsibility for public health as a supreme constituent of public welfare is manifested by every civilized government on earth. Variations in the health and disease of different nations bear a certain definite relationship to their educational progress.

It is perhaps impossible to secure absolutely accurate statistics of disease conditions and results in most of the commonwealths of the world, but many of them have sufficiently advanced in the collection of correct records that dependence may be placed in them and definite conclusions drawn therefrom. Unfortunately, in the United States we have no reliable national statistics concerning the prevalence of disease and the causes of death. Our country established its census in 1880, and with all its imperfections showed a death rate of 19.8 for every 1,000 of the population. This census has been extended until, in 1912, it covered about two-thirds of the population of the United States, composed largely of the Eastern and Central states. In 1912, the last year of completed census figures, there was a mortality of 13.9% throughout the registration area. These figures show a gratifying decrease of about six points in a third of a century. This diminution of the death rate is well nigh universal among civilized nations, several of them equaling, if not surpassing the United States, and inasmuch as their figures cover the entire nation, and our figures do not cover the South, where the mortality is greater, the comparison really looks more favorable to the United States than the actual facts warrant.

Chili showed a decline from 35.6 per 1,000 of the population to 31 from 1900 to 1911.

England declined from 18.2 to 14.6.

Austria from 25.4 to 21.9.

While Germany with her usual efficiency, reduced her death record from 22.1 to 17.3.

During this period our reduction was from 17.6 to 14.2.

Australia and New Zealand show, respectively, a very low death rate, being 10.7 and 9.3. It is impossible to tell exactly the responsibility for this low death rate, but two factors are perhaps important. The first of these is the smaller population of inferior and mixed races and the second may perhaps be reasonably ascribed to the practices of a government, particularly like those of Australia and Germany, which look so carefully after the welfare of the masses.

In the United States the total number of deaths in the registration area for 1912 was 838,251 whites and 56,050 negroes; but, it must be remembered that only four Southern states are included in this tabulation, and they only partially, since they include only statistics from municipalities of over 1,000 in population. Of these four states, Kentucky had an average mortality of 12.9; Maryland, 15.5; Missouri, 12.6, and North Carolina, 17.3. Mortality statistics in the cities of the South, such as New Orleans, Richmond, Birmingham and Atlanta, show conclusively high death rates as compared with similar cities of the North and East and Central states. About one-third of the total deaths from tuberculosis in Kentucky in 1912 were negroes, while the proportion of population for negroes was but 11.4% as compared with 88.6% for the whites. Maryland shows a typhoid death rate of almost one-half of the whites, while the population proportion of negroes is 17.9%. North Carolina shows a

*Read in Section on Public Health, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

death rate approximately equal between the races for all causes, being 3,606 whites against 3,066 negroes, but the negro population is only 31.6% of the whole.

It must be evident, therefore, that the negro race is responsible not only for its own high rate of mortality, but must also bear some burden of responsibility for the dissemination of disease and death among the whites.

It is true that certain contact diseases, notably the exanthemata, and others less understood, particularly pellagra, show a small mortality and morbidity among negroes, but this is offset by the greater prevalence and fatality of tuberculosis, typhoid and pneumonia among the negroes.

Coming more directly to the discussion of the negro problem, it is interesting to consider the figures collected by the United States government for the census of 1910, which shows that there are 9,827,763 negroes in the United States. This number constitutes 10.7% of the total population. Of these 7,777,077 are black and 2,050,686 are mulattoes. The latter have been increasing steadily since 1850 and showed the largest percentage of increase during the last decennial period, viz: 20.9% as compared with 13.2% in the decennium ending in 1860. These facts would indicate that adultery and miscegenation are still actually on the increase, and that post-bellum immorality is considerably greater with freedom than antebellum immorality with servitude. It is true that the relative increase of the white population during the past ten years is twice as great as that of the negroes, though it must be remembered that immigration is a large factor in the increase of the white population, and is of little or no imporance in the increase of the negro population.

The distribution of the races makes it plain that there is no practical problem of health in the negro race outside of the South, since the North has 98% of its population white and the West 95.9%, while the South has 69.9% of white population and 31.1% of negro population. There is no geographical division in the United States, outside of the South, that has as many as 3% of negroes in its population. Only five Northern states—Kansas, Pennsylvania, Ohio, Indiana and New Jersey—exceed 2% of negroes in the total population. From the same source I learn that the largest negro population in any state in 1910 is that of Georgia with 1,176,987; Mississippi is second with 1,047,000, and Alabama third with 908,282. Two of the Southern states — Mississippi and South Carolina — have a negro population of more than 50% of the total population, namely, 56.2% and 55.2%, respectively; while Georgia follows with 45.1%, Louisiana 43.1%, Alabama 42.5%, Florida 41%, Virginia 32.6%, North Carolina 31.6%, and Texas 17.7% only. In each of fifty-three counties scattered throughout the states of Mississippi, Louisiana, Alabama, South Carolina, Georgia, Arkansas, Florida and Tennessee, at least 75% of the total population was negro in 1910. West Virginia had the smallest percentage of negroes, namely, 5.3%. Some counties in Texas, however, have a negro population far in excess of the whites, as in Fort Bend county, with 6,746 whites and 11,422 negroes. The seventeen states which may be classed as Southern in geographical distribution, according to the census, show 8,749,427 negroes in their population.

The percentage of increase in the negro population in the last decennium is a little less than in the preceding one, though the total number of negroes is considerably increased. The percentage of increase in the last ten years was 10.4% as against 24.4% for the whites. It is further interesting to note that of the 9,827,163 negroes in the United States, 7,138,534 live in the country and are classed as rural, while 2,689,229 live in the cities and are classed as urban; and these facts must be remembered in suggesting efforts for improving their hygienic condition.

Among the cities of the South, Washington, D. C., leads with a total negro population of 94,446, while New Orleans is a close second with 89,262. Very few of the other Southern cities reach the 50,000 mark in the negro population. It is interesting to note that the negro population in the seat of the American government, during the decennium of 1900-1910, showed a percentage increase of only 8.9, where political favoritism would naturally be at its height; while Birmingham, Ala., showed a percentage increase of 215.6 during the same period. New York and Philadelphia were the largest cities of the

North in the rate of increase of negro population, showing a percentage of 51.2 and 34.9, respectively. In Texas our six largest cities present the following instructive figures:

Dallas, 18,024 negroes out of a total population of 92,104, or 20%.

Fort Worth, 13,280 negroes out of a total population of 73,312, or 18%.

Galveston, 8,036 negroes out of a total population of 36,981, or 23%.

Houston, 23,929 negroes out of a total population of 78,800, or 30%.

San Antonio, 10,716 negroes out of a total population of 96,614, or 11%.

Waco, 6,067 negroes out of a total population of 26,245, or 23%.

The percentage of mulattoes in these cities runs from 13% to 41%.

ILLITERACY.

The highest percentage of school attendance among negroes from six to twenty years of age, for any state, was found in Connecticut, being 67.1%, and the lowest, 28.9%, in Louisiana. Illiteracy among the negroes ten years of age and over was 30.4% for the United States as a whole as compared with 3.7% for the native whites. This is an additional reason and explanation of the high mortality and morbidity of infectious diseases among the negroes of the South. The lowest percentage of illiteracy among the negroes above ten years of age, in any state, was 3.4% in Minnesota and Oregon as against 48.4% for Louisiana. A comparative study of the incidence of the most important infectious diseases, and some of those producing the highest mortality among whites and negroes, give us some illuminating facts.

Among the diseases producing the highest total of deaths and percentage of mortality throughout the United States, the following are cited:

1. Tuberculosis of the lungs.
2. Pneumonia.
3. Organic diseases of the heart.
4. Nephritis.
5. Typhoid fever.
6. Malaria.
7. Puerperal fever.
8. Whooping cough.
9. Enteric diseases.

These are not arranged exactly in order of their relative morbidity or mortality, but for the purpose of illustrating my argument.

Inasmuch as only about two-thirds of the population of the United States is covered in the registration area, from which reliable statistics can be gathered, it will be understood that in the non-registration area throughout the South the relative proportion of morbidity and mortality of these infections among the negroes must be much greater than among the white population. Let me illustrate by the reports of these diseases from those Southern states reported in the census, namely:

1. Kentucky.

Deaths per 100,000 of the population from the following diseases:

	White	Colored
Tuberculosis	170.6%	432.2%
Pneumonia	85.5%	202.6%
Organic heart disease	74.5%	179.5%
Bright's disease	61.3%	102.1%
Typhoid fever	43.7%	66.8%
Malaria	8.9%	20.9%
Whooping cough	17.2%	32.6%
Puerperal fever	6.4%	16.3%

The suicide rate is three times as great among the whites as among the negroes.

2. North Carolina.

	White	Colored
Tuberculosis	163.3%	351.2%
Pneumonia	84.5%	272.3%
Organic heart disease	96.1%	209.4%
Bright's disease	74.6%	123.6%
Typhoid fever	67.2%	75.1%
Malaria	16.1%	36.4%
Whooping cough	21.9%	91.0%
Enteric diseases	137.0%	185.8%

3. Alabama.

	White	Colored
Tuberculosis	122.2%	404.1%
Pneumonia	86.3%	210.3%
Organic heart disease	101.6%	219.6%
Bright's disease	144.4%	225.9%
Typhoid fever	67.2%	87.0%
Malaria	19.1%	80.8%
Whooping cough	21.4%	16.6%
Enteric diseases	119.9%	110.9%

4. Florida.

	White	Colored
Tuberculosis	156.3%	339.2%

Pneumonia	112.8%	153.7%
Bright's disease	125.5%	243.8%
Typhoid fever	83.7%	47.7%
Malaria	13.2%	84.8%
Whooping cough	19.8%	45.0%
Enteric diseases	207.0%	201.0%

5. Georgia.

	White	Colored
Tuberculosis	111.9%	309.2%
Pneumonia	132.1%	434.1%
Organic heart disease	94.6%	150.0%
Bright's disease	179.0%	248.5%
Typhoid fever	58.5%	67.0%
Malaria	8.7%	59.6%
Whooping cough	22.4%	52.7%
Enteric diseases	22.0%	56.1%

With very few unimportant exceptions, these figures all tell the same tale, namely, that among the ignorant, illiterate and, to a large extent, defenseless negro population, the death rate, from infectious and other important diseases, some of which are largely preventable by modern sanitation, is from three to four times greater than that among the corresponding white population. The same is true of Maryland, Louisiana, Missouri and all the other Southern states.

Only three cities of Texas are covered in this report as registration cities, and only two of these, namely, Galveston and San Antonio, show a separation of the mortality rate between the white and colored races. Their exhibit is as follows:

Galveston.

	White	Colored
Tuberculosis	104.6%	337.6%
Pneumonia	148.5%	156.7%
Organic heart disease	124.8%	229.1%
Bright's disease	246.3%	385.8%
Typhoid fever	18.5%	20.3%
Malaria	16.9%	36.2%
Enteric diseases	77.6%	72.3%

San Antonio.

(A Resort City for Tuberculosis.)

	White	Colored
Tuberculosis	387.8%	341.9%
Pneumonia	87.3%	140.3%
Organic heart disease	105.0%	96.4%
Bright's disease	134.0%	254.3%
Typhoid fever	47.5%	96.4%
Malaria	15.5%	36.1%
Enteric diseases	233.1%	114.0%

Curiously enough, in the inaccurate statistics of these two cities the enteric diseases show a reversal of form, inasmuch as the whites seem to suffer more than the colored.

The average death rate among negroes in thirty-five Northern cities, each having a negro population of at least 2,500, in 1910 was 25.1 per 1,000 as compared with 15.7 for the whites, being a decrease of 2% for the negroes and 2.5% for the whites. A similar comparison for twenty-four Southern cities shows a rate of 29.6% for negroes, a decrease of 4%, and 16.9% for whites, a decrease of 2.9% in 1910 as compared with 1900.

The death rate of the colored population throughout the registration area of the United States during the year 1911 was 23.7 per 1,000 for colored people as against 13.7 per 1,000 for the white population. The high mortality of the negroes is practically shown in deaths occurring in children under five years of age. If both sexes are considered, the census report shows 49.1 per 1,000 of the population among the whites, and 106.4 per 1,000 among the negro population. Southern cities containing large negro populations illustrate the high mortality of children under five years of age among the negro population, as compared with the white, in a still more striking manner.

INFANT MORTALITY.

Such cities as Washington, D. C., present an exhibit which is highly instructive on this point. Washington showed a mortality of 643 under five years of age out of a total of 2,648 deaths among the negroes, as compared with only 537 deaths under five years of age out of a total mortality of 3,611 among the whites, and more striking still 310.8 deaths among the negroes to 119.3 among the whites under one year of age per 1,000 of the population.

New Orleans, La., shows a white death rate, under five years of age, of 37.8 as against a negro death rate of 75.1 per 1,000 of the population. Under one year of age, 123.3 per 1,000 for the whites and 247.7 for the negroes.

Baltimore, Md., for the same purpose, shows white 43.2 against 111.2 for negroes, under five years of age; and under

one year of age, 159.3 per 1,000 against 386.4 for negroes.

It will thus be seen that the infant and child mortality, under one and under five years of age, for all the registration area, shows a very great preponderance among the negroes. It is perhaps true that economic and social causes of various kinds are partly responsible for this high death rate, as well as the more prolific character of the negro population; but, it is certain that while ignorance, poverty and other economic forces and causes are responsible for much of this, the very prevalence of so great a mortality in a race so closely associated with the whites of the South must be responsible for an increased mortality and morbidity of disease in the superior race.

From the *Negro Year Book of 1913*, issued at the Tuskegee Institute and edited by Monroe N. Work, I learn that the death rate among negroes in the South is 24 to 1,000, and the average duration of life about 35 years. He stated that 450,000 negroes in the South are seriously ill all the time and lose 18 days per year from work for every individual, entailing an estimated economic loss of $75,000,000 annually. Of these constantly sick ones 112,000 are workers and 225,000 of the sick die annually, with an aggregate funeral expense of $15,000,000. He believes that 45% of these deaths may be readily prevented. This interesting pamphlet also asserts that $300,000,000 is the economic loss to the South from sickness and death among its negroes alone, and that it would pay the South to expend $100,000,000 annually in improving the health conditions of the race.

It is not necessary to multiply these figures; substantially all of them show the same deplorable condition. The negroes are the greatest sufferers from practically all the important diseases and the mortality, morbidity and economic loss thereby sustained is a charge directly and inevitably upon the white citizenship. Their responsibility is as clear as the noonday sun; it can no longer be evaded nor disregarded.

While the moral responsibility of the white race can neither be denied nor evaded, because of its superior educational and financial resources, it must not be forgotten that undeniable figures indicate that our health problems are greatly intensified by our negro population, and it becomes a most important duty to determine how far the ignorance and superstition and insanitation of the negro race are responsible for disease and death occurring among the whites.

Medical science has discovered many microscopic causes of disease; preventive medicine has evolved successful methods of dealing with some of these infections. Perhaps the most important factor in the propagation of the infections today is the human carrier of disease. It is not so difficult to recognize the responsibility of dogs, cats, cows, horses, rats, cock-roaches, fleas, flies, lice, ticks and mosquitoes, and to an appreciable extent abolish or mitigate these causes. Human carriers are more difficult. Personal contacts may now reduce the danger of the contraction of many of the infections when controlled by intelligence and a responsible sense of duty; but, when ignorance and appetite combine to lure their victims on, little can be done to mitigate the horrors of death-dealing infections. This is illustrated in the venereal problem, and in the consideration of these universally prevailing diseases the negro must bear the largest share of responsibility. It is appalling when one contemplates the prevalence of the venereal infections among the nurses of our children, the cooks in our homes, the servants who drive our automobiles, wash our clothes and have daily ingress into our homes, where personal contact greatly enhances the danger.

I wish here to record my deliberate judgment that we have never yet awakened to the significance of venereal infections, innocently acquired. Many and repeated examinations over a period of years have shown me conclusively the not infrequent occurrence of specific infection among those who have had no opportunity to contract sexual diseases. I have found it present in children of both sexes, in young men and young women of immature years, and in those whose lives are sheltered in such a way that infection would seem to be impossible. When we remember that the negroes of the South, our servants in intimate association with our families from the cradle to the grave, are widely infected, we can begin to understand how innocent infections may be

widespread. I append here the report of Dr. H. L. McNeil, Instructor in Clinical Medicine in the University of Texas, who has now completed 600 careful examinations of colored patients in the John Sealy Hospital, with the following results:

Four plus and triple plus reactions 78, or 13%.
Double plus reactions 105, or 17½%.
One plus 85, or 14%.
Plus minus reactions 70, or 12%.
Negative reactions 262, or 44%.
Negative reactions giving positive luetins 62, or 10%.

These examinations were made on all negroes admitted, regardless of disease or service on which admitted, and represent, therefore, surgical, medical, gynecological and obsetrical cases.

If my conclusions, supported by an increasing volume of undeniable evidence, are correct, the menace to the white health produced by the ignorant and unsanitary negro of the South is a problem all too lightly regarded, and one which must arouse the self-interest of our people and demand a full investigation of the subject and the inauguration of suitable remedies for these unfortunate conditions.

It seems a most difficult and often impossible proposition to designate cures for our political, social and sanitary ills, but it would seem that the most important asset of our nation, namely, the public health, requires that the best intelligence be devoted to this all-important problem. Undoubtedly, suggestions may be made looking to improvement, but many of them are chimerical or impracticable. We must have some suggestion that will appeal to the common sense of intelligent and informed men. Without claim for any or all of these as a panacea for existing ills, I beg to suggest that marked improvement may result if our people could be united in the enforcement of the following:

1. The enactment of proper housing laws, ordinances and regulations governing buildings, sewerage, drainage, water supply, ventilation and sanitation. The cities of Texas and of the South are increasing constantly in population. Our people are not yet awake to the necessity of the most stringent sanitary regulations in a climate characterized by so much heat and moisture. Many of our Southern towns and cities are dotted with negro cabins in the swampy places along the banks of the creeks, near the trash piles and dumping grounds for city refuse. These houses are unfinished and unkempt and have no efficient or sufficient drainage or sewerage. Our negro population crowds into them and thus disease conditions are favored by the greed or the ignorance and carelessness of white landlords. Housing ordinances should be demanded by our people, so that no high-brow or low-brow capitalist can continue conditions of this kind either in our cities or in the country districts.

2. *Education for Both Whites and Blacks.*—(a) The inauguration of public health and preventive medicine courses in every medical college of importance throughout the country, so that an educated and trained body of sanitarians may be supplied to states and counties and cities for their health officers. Until such a system exists neither the white nor the negro races will receive a tithe of the protective value of government control of the health to which they are entitled. The efforts of the American Medical Association, the American Public Health Association, the Southern Medical Association and of the state societies and health boards to educate the public and to put lecturers in the field is a step in the right direction; but few of these persons are trained to speak with authority on public health matters, and they can neither arouse the interest nor secure the active support of the public. Men must know what to say and what to do, and when this trained service is rendered to the public and results become apparent, then the leaven will begin to leaven the whole lump of our citizenry.

The negro race is well nigh wholly deficient in a knowledge of the elementary rules of hygiene and sanitation, and properly conducted educational efforts on ventilation, sewerage, drainage, water supply, bathing, the care of milk and other foods and the simplest methods of the conveyance of communicable disease, would meet with intelligent reception when presented in this way.

(b) The organization of efficient state, county and municipal health departments, with every modern laboratory equipment

and with well trained, well paid and full-time health officers in charge of same, not subject to political removal.

(c) The enlargement and encouragement of the educational efforts of the institutions of the colored people throughout the country, such as Tusgekee, Hampton, Wilburforce, Paul Quinn, Straight and Southern Universities, etc. Each of these institutions is doing a valuable work among its people and co-operation of bodies like these with suggestions and practical help would no doubt be gratefully received. No more inspiring spectacle of social welfare work obtains in this country than that illustrated at Tuskegee, Ala., under the direction of Booker T. Washington, who spent his time in teaching the negroes of the South to acquire homes, to till the land, to learn useful trades and become self-supporting and independent, so that no dream of social equality or political position may turn them from the straight and narrow path of success and happiness.

(d) The public schools, with the active assistance and direction of the school physicians and the teachers, may be made a most useful agent in the dissemination of health education. Booker T. Washington advised me that "In recent years there had been a great awakening on the part of colored teachers, preachers and physicians with reference to improving the health of the negroes, and there would be no difficulty in securing their co-operation." Public health lectures illustrated by lantern slides and moving pictures may be made to draw large audiences in our colored churches and schools and educational propaganda of the greatest importance undertaken and carried to a successful conclusion.

(e) Collaboration with churches and social welfare workers everywhere in the newer movements looking to the welfare of the race. The churches are ready and anxious to join in this service; their pulpits, their pastors, and their congregations may be utilized fully. They must, however, be furnished with simple, scientific and useful information.

3. *Certain social and legal restrictions* which have a political bearing, and which may become subjects of heated discussion, must be mentioned, although they may arouse divergent views among high-minded and well disposed individuals. The prohibition or restriction of the sale and use of alcoholic liquors is a necessity to the welfare of both races. How it can best be accomplished is a question men may disagree upon, but I venture to assert that there will be few to deny the injurious effects of alcoholic liquors upon a race so untrained in self-discipline as the negroes of the South. Any man who has walked the wards of a public hospital and treated negro patients, and witnessed their early death or destruction of health from disease produced by alcoholics and other poisons, will be a sincere advocate of some method to abate these fearful ills. Again, negroes with unbridled libido, with untrained minds, and without moral discipline, wander throughout the country, and, inflamed by appetite and alcohol, are the perpetrators of nameless crimes that stain our states with the acts of lawless mobs. The vagrant negro, in the city and in the country, is a menace to white health and white security. He is nearly always a criminal degenerate of high or low degree. I believe that he should be emasculated. No single factor duly advertised among the race would be so productive of restraint of the wanton, criminal lawlessness of this class of vagrant negroes as a thoroughly enforced statute of this character.

4. And finally, public clinics should be provided in all our municipalities large enough to bear the expense for medical, surgical and dental service to the poor and ignorant. Much has been accomplished by school physicians, nurses and inspectors; much more can be accomplished if our social welfare workers and all the other agencies for the public good, professional and otherwise, be organized and utilized for the public welfare.

A PLEA FOR A NATIONAL COMMITTEE ON THE ERADICATION OF MALARIA.

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Foremost among the public health questions demanding more adequate and extended consideration are malarial dis-

eases and their sequelae. As a cause of death malaria throughout the country is of relatively small importance, but in certain sections the disease prevails to an alarming extent, and in quite a number of localities even the pernicious form is of common occurrence. In the absence of trustworthy vital statistics for all of the Southern States, including the rural areas, it is impossible to estimate with accuracy the probable mortality and morbidity from malarial diseases. The problem is complicated by the frequency of erroneous diagnosis in many rural sections where there are reasons for believing that cases are reported as malaria which in all probability are typhoid fever. This source of error is not, however, of much practical importance for the purpose of the present discussion. For the United States registration area, which is exclusive of practically the entire rural South, the malaria mortality is only 2.6 per 100,000 of population. For nine representative Southern cities the mortality is 22.1 per 100,000. It may safely be assumed that for all the urban communities of the South the average malaria mortality is approximately 25 per 100,000; for the rural areas the rate is probably not less than 50 per 100,000. For all of the Southern States the total population for 1915 may be conservatively placed at 31,820,000. The proportion of urban population is, on the basis of the last census, about 25.5 per cent. If, therefore, we apply a rate of 25 per 100,000 to the urban population of the South, estimated at 7,160,000, we have an approximate mortality from malaria of 1,790. If we apply a rate of 50 per 100,000 to the rural population of the South, estimated for 1915 at 24,660,000, we have 12,330 additional deaths from malaria. For the remainder of the country the rate, as determined for the registration area of 2.6, may be reduced to 2.0, since the Southern cities included in the registration area have already been considered in the preceding estimate. Assuming, therefore, a rate of 2.0 per 100,000 of population for the Northern and Western States, the resulting number of deaths from malaria in these sections is about 1,400, which, combined with the estimated number of deaths for the urban and rural South, gives an aggregate total of 15,520 deaths from malarial diseases for the continental United States as a whole.

The social and economic importance of malaria is, however, much more accurately determined by the frequency of its occurrence as a disease. The fatality rate in malaria is, as a rule, very low. In Mississippi, for the period of January to December, 1913, the fatality rate was 1.3 per cent. for white cases, and 2.6 per cent. for colored cases. For both cases combined an average fatality rate of 1.5 per cent. is probably a conservative assumption. On the basis of an assumed fatality rate of 1.5 per cent., there would, therefore, be approximately 1,035,000 cases of malaria throughout the entire country during the course of a year. The social and economic loss resulting from this enormous amount of sickness can hardly be more than guessed at in view of the inadequacy of our existing statistical information. For the purpose of emphasizing the urgency of more adequate consideration, whether medical, scientific or statistical, the following tables have been brought together in a convenient form in support of the resolution introduced by me in Section 9, on Public Health, of the Second Pan-American Scientific Congress, and unanimously adopted by that congress in final session on January 8, 1916, reading as follows:

"That all American countries inaugurate a well-considered plan of malaria eradication and control based upon the recognition of the principles that the disease is preventable to a much larger degree than has thus far been achieved, and that the education of the public in the elementary facts of malaria is of the first order of importance to the countries concerned."

Preliminary to the tables following, it may be pointed out that while the malaria death rate in the United States registration area—that is, chiefly the Northern and Central Western States and Southern cities—is only 2.6 per 100,000 of population, it is 2.4 for Havana, 22.1 for representative Southern cities of the United States, 54.4 for Jamaica, 120.1 for Bahia, Brazil, 218.7, for Trinidad and Tobago, 475.7 for British Guiana, and finally, 643.4 for British Honduras. It may also be pointed out in this connection that in six Southern States, according to statistics collected by the United States Public Health Service, chiefly under the direction of Dr. R. H. von Ezdorf, including

8,519 cases, 65.2 per cent. were of the tertian type, 22.0 per cent. of the estivo-autumnal type, and 12.8 per cent. of the quartan variety. The observations and conclusions following rest upon the generally accepted definition according to Gould and Pyle, that malaria "is a specific infectious disease depending upon the presence in the blood of one or more of several species of closely allied parasites (Haemosporidia), which develop within, and at the expense of, the red blood corpuscles of the infected individual, resulting, according to the species and number of the parasites present, in more or less periodic febrile paroxysms, or in continued fever."

Table I exhibits the mortality from malaria in the registration area, first, for both sexes combined, and second, for males and females separately, by divisional periods of life:

This table emphasizes for both sexes the exceptional frequency of malaria in early life and the importance of the disease as a direct or contributory factor in infant mortality. It is shown that out of the mortality from malaria at all ages, 24.2 per cent. of the deaths occurred at ages under 5 years. It is shown furthermore that the rate of relative incidence diminishes rapidly from infancy to early adolescence, increasing gradually during middle life, and reaching a second maximum point of frequency in advanced age.

The second table exhibits the mortality from malaria in more detail at ages under 5 years:

According to this table the incidence of the disease is highest during the first year of life. For both sexes combined, of the deaths from malaria at all ages under 5 years, 38.4 per cent. occurred at the ages

TABLE I.

Mortality from Malaria,

U. S. Registration Area, 1910-1914—Males and Females.

Ages.	Population.	Deaths from Malaria.	Rate Per 100,000 Population.	Per Cent. Distribution.
Under 5	31,559,740	1,901	6.0	24.2
5-14	55,870,822	788	1.4	10.0
15-24	58,873,965	875	1.5	11.1
25-35	52,548,817	835	1.6	10.6
35-44	41,943,446	763	1.8	9.7
45-54	29,773,733	745	2.5	9.5
55-64	17,829,891	734	4.1	9.4
65-74	10,151,567	631	6.2	8.0
75 and over	4,283,036	554	12.9	7.1
Unknown		33		0.4
All ages	302,835,017	7,859	2.6	100.0

TABLE 1-A.

Mortality from Malaria,

U. S. Registration Area, 1910-1914—By Sex.

	Males.			Females.		
Ages.	Male Population.	Deaths from Malaria.	Rate Per 100,000 Population.	Female Population.	Deaths from Malaria.	Rate Per 100,000 Population.
Under 5	15,984,134	967	6.0	15,575,606	934	6.0
5-14	28,170,678	387	1.4	27,700,144	401	1.4
15-24	29,758,695	421	1.4	29,115,270	454	1.6
25-34	27,654,370	419	1.5	24,894,447	416	1.7
35-44	22,082,077	418	1.9	19,861,369	345	1.7
45-54	15,776,516	409	2.6	13,997,217	336	2.4
55-64	9,263,101	425	4.6	8,566,790	309	3.6
65-74	5,075,105	316	6.2	5,076,462	315	6.2
75 and over	2,025,009	285	14.1	2,258,027	269	11.9
Unknown		21			12	---
All ages	155,789,685	4,068	2.6	147,045,332	3,791	2.6

TABLE II.

Mortality from Malaria in Infancy, U. S. Registration Area, 1910-1914. Males and Females.

Ages.	Population.	Deaths from Malaria.	Rate Per 100,000 Population.	Per Cent. Distribution
Under 1 year	6,581,885	729	11.1	38.4
1 year	5,867,037	485	8.3	25.5
2 years	6,431,998	316	4.9	16.6
3 years	6,401,424	209	3.3	11.0
4 years	6,277,396	162	2.6	8.5
Under 5 years	31,559,740	1,901	6.0	100.0
Males.				
	Male Population.			
Under 1 year	3,337,487	385	11.5	39.8
1 year	2,974,647	233	7.8	24.1
2 years	3,262,362	153	4.7	15.8
3 years	3,224,000	111	3.4	11.5
4 years	3,185,638	85	2.7	8.8
Under 5	15,984,134	967	6.0	100.0
Females.				
	Female Population.			
Under 1 year	3,244,398	344	10.6	36.8
1 year	2,892,390	252	8.7	27.0
2 years	3,169,636	163	5.1	17.5
3 years	3,177,424	98	3.1	10.5
4 years	3,091,758	77	2.5	8.2
Under 5	15,575,606	934	6.0	100.0

under 1 year, or, respectively, 39.8 per cent. for males and 36.8 per cent. for females. The table is particularly suggestive in connection with scientific studies of the spread of the disease through infected mosquitoes obtaining their infection through neglected or unprotected infants during the earliest period of childhood. Since, as far as known, malaria can only be spread through existing cases of the disease, and by means of infected mosquitoes, the adequate protection of small children against the bite of the mosquito is therefore one of the very first requirements of an effective campaign against the spread of the disease.

The correlation of malaria frequency to an excessive rainfall is too well known to require extended consideration. The table following, however, will prove of interest in that the population estimates have been corrected throughout for the varying lengths of the months, so that the resulting rates per million of population may be accepted as trustworthy and conclusive:

TABLE III.

Seasonal Incidence of Malaria, U. S. Registration Area, 1910-1913.

Month.	Population (Corrected.)	Deaths from Malaria.	Rate per 1,000,000 Population.
January	236,156,155	257	1.1
February	216,092,575	234	1.1
March	238,203,415	250	1.0
April	231,528,813	316	1.4
May	240,320,075	442	1.8
June	233,577,358	507	2.2
July	242,420,787	667	2.8
August	243,471,978	904	3.7
September	236,596,323	1,018	4.3
October	245,540,466	956	3.9
November	238,598,033	534	2.2
December	247,608,944	297	1.2
Total	2,850,114,922	6,382	2.2

In connection with this table the fact, however, must not be lost sight of that the same represents conditions throughout the country and not with special reference to the Southern States, where, quite probably, the monthly incidence would slightly vary on account of different climatological conditions. According to the table under consideration, the mortality from malaria is highest during September, when it attains to 4.3 per 1,000,000, in contrast to a minimum rate of 1.0 during the month of March.

The relative frequency of malaria varies not only according to sex, but even much more so according to race. The returns have been combined for five Southern cities, for more or less of a ten-year period (1903-1915), to provide an adequate basis for average rates of at least approximate accuracy.

TABLE IV.

Malaria Mortality, By Race and Sex, Five Southern Cities (1903-1915)

	Population.	Deaths from Malaria.	Rate per 100,000 Population.
White Race.			
Males	3,639,271	267	7.3
Females	3,812,525	153	4.0
Colored Race.			
Males	1,499,336	263	17.5
Females	1,809,212	333	18.4

It is shown by this exceedingly interesting comparison for five representative Southern cities that there is a decided difference in the sex incidence of malaria frequency among the white population, while for the colored the rates are practically the same, with a slight excess on the part of women. For the white population the male rate is 7.3 per 100,000, against a female rate of only 4.0. Among the colored population the male rate was 17.5, against a female rate of 18.4. Accepting the earlier conclusions of qualified observers in the Southern States that malaria was relatively rare among the slave population, or that, in other words, the African negro was more or less immune to the disease, there has obviously been a complete change in this repect, for every investigation proves conclusively that malaria is today decidedly more common among the colored than among the whites in the Southern States. In the furtherance of a more scientific study of the relative incidence of the disease, by race and age, the following table is included:

TABLE V.

Mortality from Malaria, by Race and Age, Five Southern Cities (1906-1912)

Ages	White Rate Per 100,000 Population	Colored Rate Per 100,000 Population
Under 5 years	10.0	67.3
5- 9	2.8	19.9
10-19	3.0	25.3
20-39	5.2	26.3
40-59	6.8	36.0
60 and over	16.8	64.3

According to this table the malaria rate for the colored very materially exceeds the corresponding rate for the white population at every divisional period of life. The table is thoroughly representative and includes a sufficient population to make the rates trustworthy and conclusive.

In consequence of the remarkable sanitary progress of the Southern States the mortality from malaria has materially decreased during recent years. For the purpose of emphasizing the relative effect of these changes on the malaria death rate of the two races, the following table has been prepared for nine typical Southern cities, with comparative returns for the periods 1904-08 and 1909-13:

TABLE VI.

Comparative Mortality from Malaria, Nine Southern Cities, 1904-1913.

Race.	Death Rate per 100,000 of Population 1904-98	1909-13	Decrease Actual	Pct.
White	16.4	9.5	6.9	42.1
Colored	71.7	46.7	25.0	34.9
Total	35.8	22.1	13.7	38.3

The table brings out the striking fact that the sanitary progress of Southern cities has been of decided benefit to both races. The actual diminution in the malaria mortality of the colored race is, in

fact, nearly four times the decrease in the white race, but the relative diminution during the period under observation was 42.1 per cent. for the whites, against 34.9 for the colored. During 1904-08 the number of deaths from malaria among the colored was 437 to every 100 among the white population. During 1909-13 the corresponding ratio was 492. The relative diminution in malaria mortality was, therefore, distinctly less among the colored regardless of a very material actual decrease. In other words, the effect of race is once more, in the case of this illustration, shown to be of more profound importance than the effect of changes in environmental conditions.

It would serve no purpose to enlarge in detail upon the diminution in the mortality from malaria of the principal Southern cities. The reduction in the death rate in the case of the principal Southern cities during the five years ending with 1908, in comparison with 1909-13, are shown in the table following:

TABLE VII.

Changes in the Malaria Death Rate of Eight Southern Cities, 1904-1913.

City.	—Death Rates Per 100,000 Population—					
	Total Population		White Population		Colored Population	
	1904-08	1909-13	1904-08	1909-13	1904-08	1909-13
Charleston, S. C.	37.8	28.4	22.0	17.1	51.2	38.7
Memphis, Tenn.	120.4	80.2	67.5	41.4	190.4	139.8
Birmingham, Ala.	*	22.5	*	10.4	*	41.2
Montgomery, Ala.	65.7	52.9	25.5	15.5	101.3	90.1
Mobile, Ala.**	36.3	60.6	19.5	24.5	57.4	106.1
New Orleans, La.	16.1	9.3	12.2	6.1	27.0	18.3
Galveston, Tex.	5.4	8.7	1.1	6.9	20.4	14.9
San Antonio, Tex.	17.5	13.9	17.6	12.9	16.9	21.6

*No data available. **Periods 1906-1909 and 1910-1913.

The preceding table emphasizes the remarkable sanitary progress throughout the South as made evident in the reduction in the mortality from malaria. The table further emphasizes the greater difficulty of malaria eradication in the case of the negroes. As shown by the investigations carried on by the United States Public Health Service, under the direction of Dr. R. H. von Ezdorf, the extent of the disease is practically universal throughout the South, but the disease is by no means uncommon in the Northern and Central States, and is relatively of considerable practical importance in the great central valley of California.

The malaria surveys under the direction of the United States Public Health Service are, however, far from being as thoroughly scientific, comprehensive and conclusive as the urgency of the situation demands. They are, broadly speaking, only tentative inquiries, and, as a rule, the conclusions based on the returns must be accepted with caution on the side of extreme conservatism. The malaria index for particular counties is, broadly speaking, invariably insufficient in view of the relatively small number of persons examined. What has been done in this direction is indicative of a much more serious situation than is disclosed by superficial considerations based on mortality returns alone. The investigations by Herms, in California, illustrate the scientific and practical value of malaria surveys and of public educational campaigns based upon such investigations, with a due regard to the economic interests concerned. Of special value in this direction is the California effort to correlate malaria campaigns to the health condition of rural school children and the taxable value of the communities concerned.

As yet, however, no effort at malaria eradication has been made in this country corresponding to the work which has been done in certain portions of India, in Mauritius, on the Isthmus of Suez, and in certain sections of West Africa. Of course, in the countries and localities referred to, the situation was distinctly more alarm-

ing and often fatal to the settlement of Europeans under tropical conditions of life, than in this country. There are, however, vast areas, even in the United States, such, for illustration, as the Yazoo Delta region of Mississippi, which have been enormously hindered in their development by the relative frequency of malaria, often in a most serious form. The same conclusion applies to certain sections of North Carolina, South Carolina, Georgia, Florida, Alabama and Louisiana. There is the most urgent need for a strictly scientific determination of the true incidence of malaria as measured by the spleen rate, in conformity to the methods successfully carried through by the Malaria Committee of Bengal. An exact delineation of the areas in which black-water fever, or malarial haematuria, occurs would be of the first order of importance in the furtherance of a nation-wide effort at malaria eradication. Left to time, of course, the disease will gradually be eliminated by the economic progress of the nation, the improvement of the land, the introduction of drainage systems, etc., but many years must pass before this ideal condition is likely to exist. The practical elimination from sections in the Northern States in which intermittent fevers were exceedingly common during the early period of settlement is chiefly attributable, if not entirely so, to economic progress, rapid increase in population demanding drainage, sewerage, etc. The same result will unquestionably be experienced in the South in the course of many years. There are the strongest possible reasons for believing that if the true facts regarding malaria frequency were better understood a material improvement would be brought about in the existing situation on the basis of educational efforts such as have been suggested in a well written circular recently issued by the Public Health Service, and a more or less corresponding publication issued by the Department of Agriculture. The several State Boards of Health have also issued brief descriptive circulars of much practical value. The entire movement for malaria eradication, however, requires to be centralized in much the same manner as this has been done in the case of nation-wide efforts against infant mortality, tuberculosis, cancer, etc. Such a movement should be under the auspices of the American Medical Association, and it seems particularily fitting that the same should have the endorsement of the Southern Medical Association, the American Society of Tropical Medicine, and of all the local Southern Medical Societies, and of all other States in which malaria is of relatively common occurrence. In course of time the work of the National Committee should be extended to Hawaii, Porto Rico and the Panama Canal Zone. In the furtherance of such an effort it is proposed to organize a National Committee on the Study and Prevention of Malaria, and among others the following have given the movement the weight of their endorsement:

Dr. C. C. Bass, Professor Experimental and Tropical Medicine, Tulane University, New Orleans, La.
Dr. Rupert Blue, Surgeon General United States Public Health Service, Washington, D. C.
Dr. Henry R. Carter, Assistant Surgeon General, United States Public Health Service, Baltimore, Md.
Dr. C. F. Craig, Captain, Medical Corps, United States Army, Fort Leavenworth, Kan.
Dr. W. H. Deaderick, Author text-book on "Malaria," and "Endemic Diseases of the Southern States." Hot Springs, Ark.
Dr. W. E. Deeks, General Superintendent Medical Department, United Fruit Co., New York, N. Y.
Dr. Oscar Dowling, President Louisiana State Board of Health, New Orleans, La.
Dr. R. H. von Ezdorf, Surgeon United States Public Health Service, New Orleans, La.
Major General W. C. Gorgas, Surgeon General United States Army, Washington, D. C.
Dr. Frederick R. Greene, Secretary, Council on Health and Public Instruction, American Medical Association, Chicago, Ills.
Dr. Seale Harris, Editor-in-Chief, Southern Medical Journal, Birmingham, Ala.
Dr. Frederick L. Hoffman, Statistician, Prudential Insurance Co., Newark, N. J.
Mr. L. O. Howard, Entomologist, United States Department of Agriculture, Washington, D. C.
Mr. Arthur Hunter, Actuary New York Life Insurance Co.
Mr. J. A. LePrince, Sanitary Engineer, United States Public Health Service, Washington, D. C.
Dr. Jos. Y. Porter, State Health Officer of Florida, Jacksonville, Fla.
Dr. W. S. Rankin, State Health Officer of North Carolina, Raleigh, N. C.
Dr. M. J. Rosenau, Professor Preventive Medicine and Hygiene, Harvard Medical School, Boston, Mass.
Dr. E. R. Stitt, Captain, Medical Corps, United States Navy; Professor Tropical Medicine, George Washington University, Washington, D. C.

Dr. John M. Swan, Secretary, American Society of Tropical Medicine, Rochester, N. Y.
Dr. W. S. Thayer, Professor Clinical Medicine Johns Hopkins Medical School, Baltimore, Md.
Dr. Robert Wilson, Jr., Dean, Medical College of the State of South Carolina, Charleston, S. C.

It is sincerely to be hoped that such a committee will be formed and that its efforts will be co-ordinated in the most practical manner to the existing efforts of the Federal Public Health Service, the State and municipal boards of health, medical societies, the Rockefeller Foundation, etc. It is also anticipated that the work will obtain the active co-operation of the American Society for Tropical Medicine, of the Schools of Tropical Medicine of Tulane University, Louisiana and Harvard University, and of the Rockefeller Sanitary Commission. The movement should rest largely, if not exclusively, upon the principle of purely voluntary effort and active official co-operation. The effort, in the main, should be along the lines of the work of the Malaria Committee of India, including, first, public education; second, scientific malaria surveys; third, scientific research; fourth, statistical research; fifth, general problems such as legislation, municipal ordinances, drainage and irrigation projects, etc.

The practical difficulties no doubt are serious, but they can and will be overcome in time. Admirable illustrations of the modern American conception of the plan and scope of such an effort are the extended references to prophylaxis in Craig's treatise on Malaria, Gorgas' "Sanitation at Panama," and the recent work by Le Prince on "Mosquito Control at Panama." For a concise outline of the methods followed to advantage in India the Proceedings of the Imperial Malaria Conference held at Simla, October, 1909, and the Transactions of the Committee for the Study of Malaria in India, published in the several issues of Paludism, should be consulted, aside, of course, from the classical work of Ross, on the Prevention of Malaria, which includes important special contributions from practically all the malarial regions throughout the world. The result aimed at, if achieved, will prove of enormous social and economic benefit to the nation, in that it may safely be asserted that, next to hookworm, there is no more important cause of economic inefficiency throughout the Southern portion of the United States, and to a lesser extent in other sections of the country, than malaria. All these are facts generally well known and universally accepted. They require to be restated with emphasis and conviction. They need to be brought to public attenion until the elements of the problem are thoroughly understood every man, woman and child throughout the vast areas most seriously concerned in the eradication of malarial diseases.

TREATMENT AND COMPLICATIONS OF MALARIA.

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During the seven years (1907-1914) there were treated in the wards of Ancon Hospital, Ancon, Canal Zone, over which the author had direct supervision, about 50,000 cases of malaria. These cases represent about 80% of the total malaria treated on the Zone during that time. From the experience thus gained the author believes that he is in a position to make more or less positive statements as to the best means of dealing with an infection which is responsible for the greatest number of cases of acute illness met with in the tropics.

In 1911 the writer and Dr. W. M. James issued a report on haemoglobinuric fever in the Canal Zone, its aetiology and treatment, in which they expressed the opinion that haemoglobinuric fever was an expression of malarial toxaemia. The work since that time has tended to confirm in every particular the opinions expressed them. In a report by Stevens, in which the tables illustrative of the connection between malaria and haemoglobinuric fever have been continued largely from statistics furnished him by Dr. James, our opinions have been confirmed as to its aetiology. It is, therefore, not the intention in this article to refer to haemoglobinuric cases and their treatment, as that was fully discussed in the

report referred to, and I have nothing further to add.

A few preliminary remarks in regard to the varieties of malarial organisms found in the Canal Zone and their relative frequency may first be in order; also the gravity by infection of the different varieties. First, in regard to quartan fever, due to the plasmodium malariae: This is probably the oldest variety known clinically, and because of the more or less regular periodicity of the febrile paroxysms and its comparative benignancy it afforded the early physicians an opportunity of following out its symptomatology and course. On the Zone quartan malaria plays a very minor role. During that period when accurate blood examinations were made and the varieties of malaria carefully differentiated, it was found that about 1% of the total malarial infection belonged to this form. The death rate among the quartan types was practically nil, with the exception of one case where it was associated with a very severe nephritis, which undoubtedly played the chief role in the lethal termination. It must be confessed, however, that the malarial infection may have been the existing factor in the aetiology of the nephritis, and it will be shown later on that nephritis is an exceedingly frequent complication of malarial infections in general. Though cases of quartan malaria are benign in character and yield readily to treatment by quinine, yet they show a greater tendency to relapse probably than the other varieties; and in certain sections where this form predominates one will meet with more cases of malarial cachexia than is found where estivo-autumnal malaria is the prevailing variety.

Tertian malaria, due to the plasmodium vivax, was met with in about 20% of the cases. This also is a comparatively benign infection, and in the series there was but one death recorded against it, and this was somewhat problematical, as mixed infections are recorded in about 1% of the cases, and undoubtedly it frequently happens that one variety of the malarial parasite may be present in the peripheral blood while an associated organism such as the estivo-autumnal may be present in the deeper viscera, and thus have escaped casual examination. It was frequently found that both tertian and quartan malaria will temporarily recover without specific treatment, merely by rest and general supportive measures. This means, however, that only a temporary immunity is established and the organisms are more or less quiescent and will renew their sporulation phases with febrile paroxysms when the resistance of the patient is lowered from any cause. It is not an uncommon condition to meet with a patient, apparently in normal health, free from fever, and possibly complaining of occasional headaches and other slight discomforts, whose blood, when examined, will show parasites in greater or less number. It is also a striking clinical fact that it is only in the quartan and tertian types that we get the very large spleens which are so common in certain districts. Furthermore, there is a greater degree of anemia present in these types than in the estivo-autumnal, and a greater proneness to malarial cachexia. One practically never sees a quartan or tertian malaria without a palpable spleen, and at times this is found to be enormously enlarged. The estivo-autumnal variety, due to the plasmodium falciparium, comprised about 80% of the cases. This is by far the most virulent and is responsible for practically all of the lethal terminations, and probably is the only factor in the production of hemoglobinuric fever. The treatment, therefore, which will be outlined will refer particularly to this variety. The clinical manifestations of this form of malaria are so exceedingly varied that an extended reference to the symptoms is necessary before one is in a position to speak intelligently of the treatment. The proteiform symptomatology undoubtedly is due to localization, either of the blood cell infected parasites in the capillaries, or their toxins. Marchiafava and Bignami have referred in their exhaustive treatise on the subject to this form of localization, and there was in Ancon Hospital an abundant number of cases to illustrate their observations. Localization is not confined to malaria, but is found in a great many other affections such as rheumatism and syphilis. For example, in rheumatism one finds that the clinical manifestations may be cardiac, arthritic or neuritic, and that the parts affected are determined frequently by occupation, where a larger amount of blood

is determined through physiological causes. It is not an uncommon thing to find the lesions or the symptoms of a rheumatic in one arm, for example, of a seamstress, that arm being the one most used in her occupation. Undoubtedly this is due to a physiological determination of blood to the part. True an injured member like a sprained ankle is subject to recurring attacks of pain, in a rheumatic individual, probably due to the greater amount of congestion in the part and the scar tissue which the rheumatic poison particularly selects. Again it is not unusual in the same class of individuals to find a neuritis or a pleuritis develop on the side exposed to a draft. Individual idiosyncrasy also plays a role in the localization of disease, for, as is frequently observed, when people are exposed to conditions which lower their resistance, one may develop tonsilitis; another, a bronchitis; a third, a nephritis; and a fourth, a colitis. These undoubtedly are expressions of individual resistance in their respective organs.

We find the same thing in syphilis, which was met with frequently, particularly in the colored patients. The lesions in this class of people are almost always in the bones and viscera, and practically never in the brain. In our experience in Ancon with this disease general paresis and locomotor ataxia were met with only on three occasions in the colored race, whereas in the whites, who are undoubtedly of higher development mentally, it is very common indeed to meet with cerebral lesions. This is believed to be the result of the physiological determination of the blood.

The same condition exists in severe malarial affections, particularly of the estivo-autumnal type. A successful management of every case necessitates a determination of this localization. A very pretty example of it was shown by Dr. James in a colored woman with a severe peripheral blood infection. When she was admitted to the hospital she was also about seven months pregnant. Quinine was administered in the usual doses, and repeated examinations showed that the peripheral blood was free from parasites. Death occurred, however, and at post mortem it was shown that the uterine sinuses were practically gorged with blood-infected parasites. In other words, where physiological activity had been greatest, there was found to be the greatest number of parasites. Undoubtedly in malarial cases the premature termination of labor has been attributed to the administration of quinine, when the probabilities are that in many of these cases the production of the malarial toxins in large quantities in the maternal sinuses has led to a deteriorating influence upon the placental tissues with a termination of the physiological development. It was shown in Ancon repeatedly, as well as by pathologists elsewhere, that capillary plugging exists in the brain when few or no organisms could be found elsewhere in the body. This probably accounts for the great number of clinical manifestations which are met with in malaria that probably are not due solely to the plugging of capillaries in different parts of the system, but to a localization of toxins also, similar to that met with in other systemic affections. The following are some of the clinical manifestations of localizations: Algid forms where probably the greatest number of parasites to be met with are in the blood vessels supplying the abdominal viscera; neuritis, in the form of tics and frontal neuralgias being the most frequent, cerebral symptoms as manifested by vomiting, coma, delirium, convulsions, severe frontal headaches; and paralysis as manifested in hemiplegias, asphasias; tremors, and hyperesthesia. Undoubtedly the most frequent organs of localization are the viscera where the greatest number of organisms are to be found in the spleen, liver and kidneys. Here the organisms or their toxins frequently work great havoc, and in these organs we find not only inflammatory lesions, but actual tissue necroses. The localization and consequent symptomatology determine the method of administration and the amount of the specific agent, quinine. The following methods of administration were used: Oral, rectal, hypodermic, hypodermoclysis and intravenous.

Before proceeding with the administration of quinine in any febrile case it is most important to be assured that you have made the proper diagnosis. In any well equipped laboratory this can always be done, but a microscope of sufficient power, proper staining reagents, and a

correct technique are absolutely essential. Even then, at times, it requires considerable patience, but Dr. W. M. James' modifications of the "Ross Thick Film Method" will facilitate greatly the examination. This was published in the *Canal Zone Proceedings* of May 10, 1911, and in the SOUTHERN MEDICAL JOURNAL of October-November, 1911, Vol. IV, under the title of "The Practical Value of the Ross Thick Film Method in the Diagnosis of Malaria." In a properly equipped institution a few slides of blood should always be taken before the administration of a single dose of quinine; otherwise if this be delayed until after quinine is administered the peripheral blood becomes free from parasites and the diagnosis remains in doubt.

In a malarial country, too, often we come away with the idea that all febrile conditions are due to malaria and before a routine treatment of quinine excludes malaria as the cause of the fever it may be too late to save the patient's life from some other medical or surgical condition which was responsible for the patient's illness. Moreover, the presence of malarial parasites does not exclude the possibility of another co-incident pathological condition, and this possibility necessitates in every case a thorough physical examination.

Treatment: One specific drug is known for the treatment of malaria, and that is quinine; and this applies equally to the three known types. The only questions to be discussed are the methods of administration, the dosage, and the duration necessary to keep up the drug administration.

The methods in vogue in Ancon Hospital were by mouth, rectum, hypodermic, hypodermoclysis and intravenous. To these may be added the endermic—particularly in children.

In the vast majority of cases administration by mouth meets every requirement, and particularly so in tertian and quartan types.

It should, however, always be given in solution. In our early experience it was not unusual to recover quinine tablets and pills in the stools, which had passed through the intestinal canal undissolved. Quinine, in order to be effective, must pass into the circulating system, and an acid medium is necessary to dissolve it. When temperatures are high the natural secretions in the stomach of dilute H Cl is lessened or absent, and when this is the case the undissolved quinine passes through the intestinal canal undissolved; its contents are alkaline.

For these reasons it is far more certain and effective to give it in solutions. The dosage was experimented with and after a long experience the conclusion was reached that the best and quickest results were obtained by giving fifteen grains three times daily. This dosage was continued until the temperature remained normal for three or four days, when the dose was lessened to ten grains three times daily for another week, and the patient was advised then to take twenty grains daily for the third week.

In addition to the quinine treatment calomel in a 3-grain dose was administered on the day of admission and followed by an ounce of magnesium sulphate in eight or ten hours. This is very important, and it was found of great advantage to repeat the magnesium sulphate after the temperature dropped. As a rule the patient's appetite did not return until after the second dose was administered, as it aided in the elimination of toxins. Food was not denied whenever the patient could take nourishment. Necessarily in the febrile state this consisted of liquids and simple solids.

Though this simple method was sufficient to deal with the great majority of cases, it did not suffice in the cerebral and pernicious types. One reason, probably, is that in these latter types the organisms localize in some part of the peripheral circulations and the quinine solution must filter through the liver before it could reach the organisms, and in the liver undoubtedly some of it is chemically changed or destroyed.

To deal with these cases successfully the quinine must be gotten quickly to the peripheral circulation by use of one of three methods—hypodermically, intravenously or by hypodermoclysis. The last method means the administration of a dose of quinine—from 15 to 30 grains—in a large quantity of normal saline, from one-half to one pint. This method was tried out, but in a couple of patients with low resistance extensive

sloughing of tissues followed, and it was abandoned.

In general the hypodermic method was used, and on the whole gave excellent results. The contents of ampoules containing 7½ grains of the di-hydrochloride salt were diluted with 10cc of normal saline, and injected in the deep subcutaneous tissue, preferably behind the pectoralis major, in the abdominal walls, and in the buttocks. The part was then thoroughly massaged and a hot water bottle applied. This gave us practical freedom from necrosis, followed by abscess, which was very common if the solution was injected too concentrated or too superficial. We obtained better absorption in the subcutaneous tissue than in the intramuscular injections.

Occasionally, however, if the patient was very weak or had a low resistance, necrosis would occur, notwithstanding every precaution. Care had also to be taken so that the injections were not given in close proximity to each other.

Usually two injections of 7½ grains each were given, at two or four hour intervals, until 45 to 75 grains were administered, according to the condition of the patient, and then, as soon as the stomach could tolerate it, the quinine was resumed by mouth as above directed.

In the very grave cases we employed the intravenous method with very gratifying results.

The only precautions necessary were strict surgical cleanliness and the dilution of the quinine solution from 250 to 300 times with normal salines, after the suggestions of Gilchrist, who found that with this dilution there was no danger of the formation of emboli. The longer this method was used the more frequently we used it in all cases of severe infections, and in a physician's hands it is perfectly safe.

Occasionally we met with grave infections attended with severe and persistent vomiting, and also algid types when none of the above described methods would give relief. In these cases we adopted the rectal method of administration, for a few doses, until the vomiting ceased.

Sixty grains of quinine solution, in ten or twelve ounces of warm normal saline, were injected with a high rectal tube, after a preliminary cleansing enema.

Frequently this method is of great service, particularly if the malarial organisms are chiefly localized in the portal system, and this condition is associated with much vomiting, in which case oral administration is temporarily impossible.

In all pernicious cases, however, after the acute symptoms disappeared oral administration was resumed.

We also found that in cases of malarial cachexia, which occurred chiefly among white foreigners who would not remain long enough under treatment and where the bone marrow seemed to be affected, a few initial doses of quinine, either hypodermically or intravenously, seemed to materially hasten convalescence.

The duration of the temperature under quinine treatment is variable. With the treatment outlined above the temperature in tertian and quartan cases usually drops to normal in a few hours and remains so. Rarely indeed do we get a rise due to another sporulation.

In estivo-autumnal cases, on the other hand, the temperature may drop to normal within a few hours and remain so; or it may drop, and a temperature of moderate degree lasting from 48 to 72 hours recur, before it remains normal. This was frequently met with and was very characteristic, the temperature curve resembling the neck and back of a swan.

In a third class of more or less pernicious cases the temperature remained more or less high with only slight remissions till the third or fourth day, and in rare instances till the sixth day, when the temperature fell by lysis or crisis, and then remained normal. Temperatures persisting beyond this, it can safely be concluded, are not malarial, providing treatment has been carried on as above indicated.

Subnormal temperatures occurred not only in algid forms, but was very common in those cases associated with severe nephritis. This will be referred to again, however, in discussing the complications of malaria.

Malaria will complicate, as far as my experience goes, every known disease; although in pneumonia, associated as it is with a high leucocytosis, we could disregard its presence as far as treatment was concerned until the patient's convalescence from pneumonia was established.

In typhoid fever, however, the presence of malaria meant the administration of quinine in the regular dosage.

Syphilis, in all stages, was a frequent complication with malaria, and it was our experience that both conditions had to be treated synchronously in order to establish convalescence.

Many a malarial patient continued to run an irregular temperature after convalescence should have been established, because of an overlooked luetic infection, but which yielded promptly with the administration of specific treatment. This was one of the frequent causes of malarial relapses. In fact, any constitutional or local condition which in itself interferes with the health of the patient will interfere with the convalescence and cure of a supervening malarial infection, and hence tend to bring about relapses.

Toleration of quinine and untoward results: It is surprising to find how well quinine is tolerated, even in large doses, by nearly all patients. Complaints of disturbance of vision and deafness are very common for the first few days of treatment, but subsequently toleration is established and the solution is taken without objections. In only one instance did I find vision permanently interfered with, and very rarely did any permanent interference with the organ of hearing result.

It was very common, however, to find a general urticaria following quinine administration, but this soon disappeared, particularly when oral medication was replaced by hypodermic treatment.

The most serious and distressing complication that we had to deal with (and fortunately it was rare) was a general dermatitis all over the body, which went on to extensive exfoliation, so that even the hands and feet exfoliated in casts. In these cases, again, the quinine could be administered hypodermically without untoward symptoms.

Again we found not infrequently, in the earlier days when this intensive treatment was used, the development of a hemoglobinuric attack after the administration of a single dose of quinine, which in one instance was as small as 1 grain. In this individual case in Dr. A. B. Herrick's clinic the patient could not tolerate quinine in any form, and he died while returning to Europe from an attack of malaria. Fortunately these instances are rare.

Do patients ever acquire immunity to malaria? Before the American occupation of the Canal Zone and the sanitation of Panama City, malaria was rampant. Afterwards quite frequently cases were met with in the city among the native population, but almost always in infants and young children. The author was frequently called in consultation to see patients in the city, but has no knowledge of ever having met with malaria in an adult except in an instance of a young woman about twenty years of age, who had spent several years in a convent near New York, returned to the isthmus, married, and gave birth to a child. About three weeks after the child was born she suffered from an attack of malaria.

In view of the above considerations one is forced to the conclusion that in malarial districts a temporary immunity at least is established, and I believe in otherwise healthy individuals a permanent immunity is very common. Native Panamanians who have lived practically all their lives in Panama City have been operated on for serious surgical conditions and have completed their convalescence without a malarial attack, and the blood of these patients had proved negative to malarial parasites after repeated examinations.

Examinations of the blood of all individuals in a native settlement has shown a high percentage of infection, notwithstanding that normal temperatures were present. It is doubtful if immunity can be established if the patient is suffering from any co-incident condition that will lower his resistance. Temporary immunity was frequently met with. Individuals who were apparently leading healthy existences, receiving an injury or undergoing an operation, or having developed some prostrating affection, would promptly develop a typical attack of malaria without the possibility of a re-infection taking place.

Complications: The most frequent of these was nephritis. In fact, in every severe case of malaria, kidney irritation and more or less severe nephritis could be demonstrated. In the vast majority of cases this pathological condition disappeared with the convalescence of the patient, but not infrequently more or less

permanent damage remained, which sooner or later proved fatal. Frequent pathological findings in fatal pernicious cases were focal necroses in the kidneys, liver and spleen, which meant destruction of tissues in these organs and permanent damage.

The malarial nephritic's urine in severe cases showed large quantities of albumin and large number of casts, many of which were covered with pus cells. The quantity of urine was large; very slight, or no oedema was present, and the blood pressure was low. They also frequently ran subnormal and somewhat irregular temperatures during convalescence. Dr. H. Clark, of Ancon Hospital, has become convinced from his studies that the Rose-Bradford kidney is malarial in origin.

Another complication met with was hemoglobinuric fever, concerning which Dr. W. M. James and the author published a report covering 230 cases. Cytolysis, a related condition to hemolysis, was not uncommon, leading to hemorrhages from the kidneys, mucous membranes, the conjunctival sac, and occasionally an extensive purpura hemorrhagic condition over the whole body. This condition was treated similarly to hemoglobinuria.

Jaundice, more or less severe, was not uncommon; and bronchitis was frequently seen as a complication.

Anaemia was a striking feature, following an attack of tertian or quartan fever; much more so than the estivo-autumnal form. This, however, was temporary, except in chronic or neglected cases, when the condition of malarial cachexia ensued.

The treatment of malaria in children is very simple. If the attack was severe, we never hesitated giving an initial dose of 5 grains, hypodermically in the buttocks, even in an infant. Subsequently one grain in solution for each year of life was given three or four times daily. Children tolerate quinine better than adults. The endermic use of quinine in children is recommended by some, but we never used it routinely in our treatment.

In conclusion, it can be stated that malaria uncomplicated is an easily curable disease, if treatment be properly carried out, with the exception of the very severe pernicious types (fortunately rare), when even the most energetic action at times will not save the patient's life.

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AUTHOR'S ABSTRACTS

Tropical Diseases and Public Health

Statistics of Disease. Their Sources, Uses and Limitations. By John W. Trask, U. S. P. H. S. American Journal of Public Health, May, 1915, pp. 446-452.

In considering statistics of disease, mortality statistics, which treat of deaths, are usually considered with morbidity statistics, which relate to the occurrence of sickness. Mobidity statistics show the prevalence of disease and play an important part in public health administration. In their absence mortality statistics serve to some extent as an indicator of the prevalence of cases. Mortality statistics are obtained from the registration of deaths, which is readily obtainable through control over the disposal of the dead. Although practically all deaths may be registered, it is a fact that the actual causes of death are frequently not given. Mortality statistics, therefore, with proper registration methods are accurate as to the total number of deaths but are not to be considered as showing in all instances the causes of death nor the relative importance of the several causes.

Morbidity statistics differ from those of mortality in that, excepting for a limited number of diseases, it will never be possible to get all cases reported. The reasons for this are that many cases are mild and atypical, and not recognized. Others do not come to the attention of practicing physicians. On the other hand, cases of notifiable diseases are not reported until the diagnosis is practically certain. As a result, the diagnoses are correct in a very high percentage of all cases reported.

Mortality statistics, then, are complete as to numbers but defective as to causes of death, while morbidity statistics are correct as to diagnoses but incomplete as to numbers.

SURGERY, GYNECOLOGY, OBSTETRICS AND GENITO-URINARY DISEASES

AN EXPERIMENTAL STUDY OF THE USE OF SODIUM CITRATE IN THE TRANSFUSION OF BLOOD BY THE DIRECT AND INDIRECT METHODS*.

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The greatest danger in the transfusion of blood is that of hemolysis. That it can be avoided by preliminary examination of the blood has been well established by Ottenberg and Kaliski[1] and also by Ottenberg and Libman[2]. The relation between extravascular and intravascular hemolysis is so close that the latter can be avoided if the former does not occur.

The methods of testing the blood of the prospective donor and that of the prospective recipient for agglutination and hemolysis, which were devised by Epstein and Ottenberg[3] and by Weil[4] require several hours and it is usually necessary to withdraw blood from the veins of the prospective donor and recipient to go enough for the test.

The method of Rous and Turner[5] is unquestionably the most desirable. It only requires a drop of blood and the examination can be made within a half-hour. The blood is mixed with a 1/10 per cent. solution of sodium citrate, in an ordinary pipet for counting the leucocytes, in the proportion of 10 to 1, so that a one per cent. mixture of citrated blood is obtained from the donor and also from the pipet for counting leucocytes, in the recipient. The blood of the prospective donor is then mixed with that of the prospective recipient in the proportions of 1.9 and 1:1 in Wright's tubes (an ordinary glass tube drawn out with a capillary end). A drop of these mixtures is observed on a slide under the microscope. If agglutination occurs within fifteen minutes the bloods should be considered incompatible and another donor should be sought; if agglutination does not occur within that time, especially in the 1 to 9 mixture, the bloods may be considered compatible and free from the dangers of hemolysis. There is a difference of opinion concerning the dangers from agglutination alone, but hemolysis is always preceded or accompanied by agglutination. If agglutination is eliminated, the possible dangers of hemolysis, which are far more serious, can safely be avoided. Isohemagglutinins and isohemolysins are frequently present in the blood of different individuals and may even be present in the members of a family related by consanguinity. A preliminary blood examination should, therefore, always be made before transfusion by any method is used.

The transfusion of blood has received much attention from experimenters and clinicians, the object being to devise a method which would prevent clotting and thus avoid the dangers of thrombosis and embolism. The fact that so many different methods have been devised in recent years is evidence that there is some objection to most of them, either in the necessary operative skill, or the complexity of the method and apparatus required. These objections apply to the methods of direct transfusion.

The method of indirect transfusion which has recently been developed seems to be by far the best as it is so simple that it can be used by any general practitioner. Since the introduction of this method, transfusion need no longer be regarded as a surgical procedure.

The method of uniting the blood vessels of the donor and recipient, as devised by Crile[6], Elsberg, Carrel and others, seemed at first to meet all the requirements of of successful transfusion. The blood is kept in contact with the endothelial lining of the vessels, which prevents clotting. However, these methods require such operative skill that they can only be used by a limited number of surgeons.

The introduction of tubes coated with paraffin by Brewer and Leggett[7] and by

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Vincent[8] simplified the operative procedure considerably. When a vein is united to a vein, a long time is required for the transfusion, and the flow is uncertain. Even when an artery is united to a vein, it is impossible to measure with accuracy the amount of blood transfused. Libman and Ottenberg[9] suggested a method of calculating it approximately, based upon the increase in the patient's hemoglobin, but a simpler and more direct method is very desirable.

The method introduced by Curtis and David[10] in 1911 was the first to provide an accurate measurement of the blood transfused without allowing it to clot. The fact that many other methods have been devised since then shows that no one of them is entirely free from certain objections. Risley and Irving[11]in 1912 made a careful, critical review of all the methods that had been proposed up to that time. They tried all of the methods in the laboratory of surgical research of the Harvard Medical School and reached the conclusion that, all things considered, the method of Curtis and David was the most satisfactory.

Lindemann[12] in 1913 published the results of his first transfusion by means of needles introduced into the veins of donor and recipient, using Record syringes for withdrawing and injecting the blood. This is based upon the well known fact that blood withdrawn directly from a vessel into a syringe clots slowly as compared with blood exposed to the air. During the last two years this method has been used successfully in a large number of transfusions by Lindemann and others. Unger[13] has devised a three-way stopcock which is designed to lessen the danger of clotting. Lindemann's method requires twelve Record syringes and four or five assistants who must work together with precision. It requires such dexterity that it can only be carried out in hospitals. Any delay in filling or emptying the syringes, or failure to wash out the needles with physiological salt solution, causes a clot to form. Failure to clean the syringes thoroughly may result in intravascular clotting. The writer has seen extensive thrombosis occur in a large dog and cause sudden death after transfusing 480 cc. of blood from one jugular vein to the other by means of Lindemann needles and Record syringes. There was extensive thrombosis in the veins, and the heart was overdistended with adherent clots in the right auricle and ventricle. This method can not be considered free from danger.

After the earlier experiments presented in this paper had been performed, Hooker and Satterlee [14] published their method of withdrawing blood into a paraffined cylinder containing enough hirudin to prevent coagulation. While the methods are similar in some respects, each investigation was conducted independently of the other. The method employed by Hooker and Satterlee is more complicated and the blood is kept out of the body for a longer time. Hirudin is difficult to obtain and some preparations of it are toxic. Although 0.3 gram of hirudin has been given to women without producing any toxic effect, Lewisohn[15] has observed alarming symptoms from 0.1 gram given to man. He also found that a dog of moderate size, died four days after 0.1 gram of hirudin had been given.

All of the foregoing methods may be considered under the heading of direct transfusion, since the blood is taken immediately from the donor to the recipient. Some would restrict this term to those methods which unite the vessels by cannula or suture, but it seems better to include all methods where the blood is transfused directly without delay. Under the heading of indirect transfusion we would class those methods where the blood is defibrinated or is made non-coagulable by the addition of some substance. There is no need of haste in these methods, and the blood may be kept outside the body for several days. Aside from the simplicity of indirect transfusion, it offers the additional advantage that several injections may be made on succeeding days. That may be desirable in hemorrhagic diseases and possibly in some infections.

Moss[16] described a simple method of indirect transfusion in 1914. He received the blood from a needle in the donor's vein into several small flasks containing glass beads. These were used to defibrinate the blood by agitation for ten minutes. The blood is then filtered through several layers of sterile gauze and in that way 500 cc. of defibrinated blood may be obtained from 600 cc. of blood. The injection into the recipient's vein is made like an ordinary saline infusion, a coil of rubber tubing immersed in warm mater

serving to keep the blood at the temperature of the body.

The objection to this method is that the mechanical agitation may injure the corpuscles and favor hemolysis. The removal of fibrinogen and the formation of thrombin do not seem to be such serious considerations.

Hustin[17], of Brussels, in May, 1914, first used citrate of soda to prevent the coagulation of blood so that it can be transfused indirectly. He used 0.2 per cent. citrate and diluted the citrated blood with an equal amount of saline solution as he feared the undiluted blood might be dangerous. He also added glucose to prevent coagulation. Subsequent experiments have shown that such dilutions and the use of glucose are not necessary. Hustin's observations were made upon animals and one case of transfusion in man.

At a meeting of the New York Academy of Medicine in December, 1914, Weil [18] stated that he had successfully done indirect transfusions in man, using a 1 per cent. strength of citrate of soda and transferring as much as 250 cc. of blood, i. e., citrated blood containing 2.5 grams of citrate of soda. Ottenberg and Libman[2] in July, 1915, stated that Dr. Weil had done 200 indirect transfusions with citrated blood in 46 patients. He usually used from 300 to 350 cc. of blood with one per cent. sodium citrate, occasionally 0.3 per cent. The patients usually had polyuria for 24 hours, but otherwise the reactions were not different from those which follow other methods of transfusion. The coagulation time was reduced considerably immediately after the transfusion but gradually returned to normal within a few hours.

Lewisohn[15] reports 18 successful cases of indirect transfusion in man, using 0.2 per cent. of sodium citrate. In one case he transfused 800 cc. of blood on two consecutive days. There was diuresis in most cases, which disappeared within 24 hours. He confirms Weil's observations that the coagulability of the blood is increased immediately after the transfusion and returns to normal within a few hours.

Ottenberg and Libman[2] have recently made a valuable report of 189 cases of transfusion in the Mount Sinai Hospital, New York. This paper gives a splendid review of the entire subject. In discussing the technic of transfusion, they state that the majority of their cases were transfused directly from vein to vein or artery to vein. They conclude by saying that they have seen all the newer procedures used and they believe the method of Lindemann as modified by Unger and the citrate method of indirect transfusion are at present the methods of choice.

METHODS OF TRANSFUSION USED.

This paper only deals with laboratory experiments upon animals, but the method has been used clinically by Dr. A. O. Singleton. Most of the experiments were directed toward a simplification of the apparatus devised by Curtis and David and an improvement upon the method used by them for direct transfusion. The second part of the investigation deals with indirect transfusion. Those experiments were performed after the publication of the results obtained by Weil and Lewisohn.

Curtis and David use a glass cylinder of 300 cc. capacity with two tubes coming from the lower end, which serve as cannulas. These are tied in the veins of the donor and recipient, respectively. The upper end is closed by a perforated stopper connecting with a piston syringe. By means of a two-way stop-cock this can be used alternately to produce a negative pressure to draw the blood into the cylinder from the donor's vein, and also to produce a positive pressure to force the blood into the recipient's vein. The cylinder is coated with paraffin to prevent the blood from adhering to it and physiological salt solution, covered with liquid vaseline, is placed in the cylinder before starting transfusion by their method.

The special glass cylinder used by them is easily broken and at best it only has cannulas of one size, making it difficult to get them into the veins of varying size.

We have substituted an inexpensive cylindrical percolator, ten inches long, with a mean diameter of two inches and a capacity of 250 cc. or 300 cc., such as is commonly used by pharmacists. A Y-shaped glass tube drawn out to form two cannulas is inserted into the lower end by means of a perforated rubber stopper. The inexpensive cylinders and cannulas make it possible to keep several of them

on hand for veins of variable size. The cylinder is calibrated to measure the amount of blood. The cannulas and cylinder are coated with paraffin.

The top of the cylinder is closed by a perforated rubber stopper with a bent glass tube connected by rubber tubing with the top of an aspirator bottle of 2,000 cc capacity filled half-full with water. This connects with another aspirator bottle (No. 1—See illustration) or an irrigation can by rubber tubing of good size (⅜-inch diameter). By alternately lowering and raising the bottle (No. 1) the cylinder can be filled by a negative pressure and emptied by a positive pressure. The valves in the veins are sufficient to prevent the blood from entering the cylinder from the recipient's vein and also to prevent any reflex into the donor's vein during the emptying of the cylinder.

The use of pressure bottles does away wih special apparatus which is apt to get out of order; it also enables one to change quickly from negative to positive pressure, or vice versa; the amount of pressure is definitely known and can be varied at will.

Other methods of varying the pressure have been tried, but none proved as satisfactory as the pressure bottles. If these are not available, one may use the mouth applied to a bottle with two tubes in the stopper to produce negative pressure by suction and positive pressure by blowing. Some sterile gauze in such a bottle will serve as an air filter between the mouth and the cylinder.

Sufficient variation in pressure can be obtained by lowering the aspirator bottle two or three feet and then raising it an equal distance above the level of the table. It is not desirable to produce enough negative pressure to cause the donor's veins to collapse. *It is desirable to fill and empty the cylinder within a minute,* or *at the utmost the blood should not remain in the cylinder more than one and one-half minutes.* The amount of blood transferred at one time should be varied, if necessary, to keep within this time limit. Generally the cylinder can be emptied in one-fourth or one-third of the time required to fill it.

SOLUTIONS USED IN CYLINDERS.

The most important improvement that we have been able to make in the method of transfusion is in the solution placed in the cylinder to prevent coagulation. Curtis and David used about 50 cc. of physiological salt solution covered with liquid vaseline. We have found that this does not retard coagulation. Frequently the blood clots in the cylinder before the transfusion has been carried as far as is desired.

Numerous experiments have been performed to determine the most desirable fluid to retard coagulation in the cylinder. We have used solutions of sodium citrate and of hirudin, comparing the results with a control in which the same amount of physiological salt solution was used. It is not necessary to cover any one of these fluids with liquid vaseline. We have not been able to see that it has any influence in retarding coagulation.

When physiological salt solution is used a clot begins to form in a short time. At first it adheres to the walls of the cylinder. The clot rapidly increases in size until all of the blood in the cylinder and cannula clots.

When a solution of hirudin or a solution of sodium citrate is used, transfusion can be carried on for a much longer time, making it possible to fill and empty the cylinder a greater number of times, and a large clot of all the blood in the cylinder never occurs. When a clot does form after a considerable time, it is only a small one in the cannula and neck of the cylinder where the blood from the donor does not have a chance to mix with anticoagulant fluid in the cylinder.

The results of our experiments indicate clearly that a two per cent. solution of sodium citrate retards coagulation quite as well as hirudin and has certain advantages over the latter. Hirudin is expensive, difficult to obtain, and being a proteose body is liable to be contaminated by some toxic material. It may also be unstable and not able to withstand sterilization at a high temperature without undergoing some change. From the report of Lewisohn's observations some preparations of it can not be considered safe and free from toxicity. On the other hand, sodium citrate is cheap, non-toxic, always obtainable, and withstands repeated sterilization without undergoing any change.

Sodium citrate prevents coagulation by forming a compound with the calcium of the blood so that it is non-ionizable and hence unavailable for the formation of thrombin or fibrin ferment. Hirudin is a proteose body obtained from the heads of leeches and acts as an anti-thrombin, thus rendering the thrombin or fibrin-ferment inert. One milligram of it destroys the coagulability of from 7 to 10 cc. of blood.

We have found that transfusion can be continued from 2.5 to 3 times longer with a two per cent. solution of sodium citrate, or with a solution of hirudin, than can be done with physiological salt solution, judged either by the total time of transfusion or by the number of times the cylinder can be filled and emptied.

NECESSARY PRECAUTIONS IN PARAFFINING THE CYLINDER AND HANDLING THE VEINS.

We have found that plain paraffin is not as desirable for coating the cannula and cylinder as the mixture recommended by Risley and Irving, or that suggested by Hooker and Satterlee. The former consists of the following ingredients by weight: Paraffin two parts, stearin one part, and white petrolatum two parts. The mixture recommended by Hooker and Satterlee consists of Grubler's paraffin (melting point 60° to 62° C.) 56 parts, and white petrolatum 44 parts, by weight. This melts at 50° C., or 120° F.

The melted mixture should be kept free from any foreign particles by filtering. It is important to apply it at the proper temperature, viz., 60° 62° C. If it is too hot, it leaves a very thin film; if it is too cool, the film is apt to be too thick and narrow the lumen of the cannula. After it has been drawn to the top of the cylinder and allowed to escape, the cylinder and cannula should be inverted and a current of air drawn through it so that the paraffin mixture does not narrow the lumen of the cannula at the neck of the latter. Unless this precaution is taken the openings or the constricted portions of the cannula are apt to be narrowed or nearly occluded by the melted paraffin gravitating to those parts as it cools.

Great care should also be exercised in handling the vein with every precaution to avoid injury to the intima. If clips are used they should have a very weak spring and the serrated surfaces should be covered with rubber tubing. The same precaution should be used with mosquito hemostats. Injury to the intima by rough handling of the veins or by the application of heavy hemostats with serrated surfaces hasten coagulation. It is also necessary to avoid detaching the intima by pushing a large cannula into a small vein. The vein may be opened by making a V-shaped incision half-way across it with scissors, or by cutting squarely across the vessel and grasping all of the coats with three small mosquito forceps to keep the intima from being detached during the introduction of the cannula.

METHOD OF EXPERIMENTATION.

All of the experiments were performed on dogs. In the first group of experiments the blood was transfused from the distal end of one jugular or femoral vein to the proximal end of the corresponding vein of the opposite side, using physiological salt solution in the cylinder for one part of the experiment and a solution of sodium citrate or hirudin in another cylinder for the other part in transfusing from the other ends of the same veins. Such double crossed transfusion caused stasis for a considerable time in the vein used for the second part of the experiment. To avoid that, and to maintain exactly the same conditions for each transfusion, it was found desirable to only use one vein for each part of the experiment. In all of the experiments except those of the first group the transfusions were made from the distal to the proximal end of the external jugular vein, using the vein of one side for the first part of the experiment and the other one for the second part.

After the first few experiments it was found desirable to transfuse the same amount each time and 100 cc. were transfused at a time in practically all of the experiments. The transfusion was continued in each part of the experiment until the further flow of blood was stopped by the formation of a clot in the cannula or cylinder. As the negative pressure in filling and the positive pressure used for emptying the cylinder was practically the same each time, the number of times the cylinder was filled and emptied, and the total time for transfusing with each fluid,

were taken as the basis of comparison in determining the value of citrate of soda and hirudin, respectively, in retarding coagulation.

A graphic record of each transfusion was made by interposing a T tube between the cylinder and pressure bottle and connecting it with a mercury monometer. This registered the amount of negative and positive pressure used each time on a revolving drum over an electro-magnet marking seconds. In the tabular statements of the experiments these pressures are given in their equivalents in a column of water.

In the first and second groups of experiments practically a uniform negative pressure was used for filling and a uniform positive pressure for emptying the cylinder each time. Naturally that caused variations in the time that the blood was in the cylinder. *It soon became apparent that the length of time the blood is kept out of the body is the most important factor in this method of transfusion.* In the third group the pressure was varied by the bottles so that the blood was kept in the cylinder for a uniform period of time, viz., *one minute.*

GROUP I.

Transfusion from one jugular or femoral vein to the other, using the same veins twice.

Number of Exp.	Veins Used.	Amount of Blood	Negative Pressure For Filling.	Positive Pressure for Emptying.
II	Femoral	100 cc	—13.5 cm. water	+ 25 cm. water
III	Jugular	100 cc	—13.5 cm. water	+ 25 cm. water
V	Jugular	100 cc	-13 to -17 cm. water	+ 14 to + 30 cm. water
VI	Jugular	150 cc	—11 cm. water	+ 35 cm. water

Exp.	Sol. in Cylinder (50 cc.)	Number of Fillings	Time of Filling	Time of Emptying	Total Time Clyinder
II	a Ringer's Sol.	8	40-57 sec.	15-40 sec.	60-100 sec.
	b 2% Sodium Citrate	17	45-135 sec.	15-25 sec.	60-240 sec.
III	a 2% Sodium Citrate	88	20-40 sec.	10-25 sec.	35-60 sec.
	b. Ringer's Sol.	13	35-80 sec.	30-50 sec.	75-115 sec.
V	a 1% Sod. Citrate	25	20-30 sec.	15-45 sec.	30-75 sec.
	b Ringer's Sol.	13	30-40 sec.	15-22 sec.	50-55 sec.
VI	a 1.5% Sodium Citrate	16	20-70 sec.	25-45 sec.	55-110 sec.
	b 2% Sodium Citrate	28	20-55 sec.	13-65 sec.	45-120 sec.
	c Ringer's Sol.	16	40-60 sec.	10-20 sec.	45-75 sec.

Summary.

Exp.	Fillings under Ringer's Sol.	Fillings under Citrate Sol.	Ratio	Time with Ringer's Sol.	Time with Citrate Sol.	Ratio
II	8	17	1:2.1	9 min.	22 min.	1:2.4
III	13	88	1:6.7	16 min.	70 min.	1:4.4
V	13	25	1:1.9	11 min.	23 min.	1:2.1
VI	16	28	1:1.7	17 min.	29 min.	1:1.7
Average	12	39	1:3.1	13	36	1:2.7

GROUP II.

Transfusion from distal to proximal end of one external jugular vein for each part of the experiments without previous stasis or injury. Uniform pressure used in filling and emptying cylinder; time variable.

Number of Exp.	Vein Used for 1st Part (a).	Vein Used for 2nd Part (b)	Negative Pressure for Filling.	Positive Pressure for Emptying.
IX	Right Jugular	Left jugular	-15 cm water	+ 15 cm. water
X	Right Jugular	Left jugular	-13 cm. water	+ 20 cm. water
XI	Left jugular	Right jugular	-29 cm. water	+ 25 cm. water

Exp.	Sol. in Cylinder (50 cc.)	Number of Fillings	Time of Fillings	Time of Emptying	Total Time in Cylinder
IX (a)	1.5% Sod. Citrate	18	30-40 sec.	10-20 sec.	40-60 sec.
(b)	0.9% NaCl	75	20-50 sec.	10-15 sec.	30-65 sec.
X (a)	2% Sod Citrate	106	10-25 sec.	7-20 sec.	18-40 sec.
(b)	0.9% NaCl	21	25-50 sec.	10-20 sec.	30-60 sec.
XI (a)	2% Sod. Citrate	55	15-40 sec.	5-30 sec.	20-70 sec.
(b)	0.9% NaCl	34	12-30 sec.	12-30 sec.	25-60 sec.
(c)	1.5% Sod. Citrate.	131	8-12 sec.	7-10 sec.	15-23 sec.

Summary.

Exp.	Fillings Under 0.9% NaCl.	Fillings Under Citrate	Ratio	Time with 0.9% NaCl	Time with Citrate	Ratio
IX	75	18	1:0.24	49 min.	16 min.	1:0.3
X	21	106	1:5	18 min.	44 min.	1:2.4
XI	34	55	1:1.6	22 min.	30 min.	1:1.4
Average	43	60	1:1.4	29 min.	30 min.	1:1

GROUP III.

Variable Pressure. Uniform Time.

Transfusion from distal to proximal end of one external jugular vein for each part of experiment. Withdrew 100 cc. blood each time, except 75 cc. in Exp. 22. Pressure varied from -10 to -60 cm. water in filling, and from plus 10 to plus 60 cm. water in emptying so as to keep blood out of the body for approximately the same time (60-70 sec.)

Exp.	Sol. in Cylinder	Number of Fillings.	Time of Filling.	Time of Emptying.	Average Time in Cylinder.
XIV	(a) 0.9% NaCl	18	15-50 sec.	10-30 sec.	65 sec.
	(b) 2% Citrate	16	25-50 sec.	10-45 sec.	70 sec.
XV	(a) 0.9% NaCl	6	35-50 sec.	15-55 sec.	70 sec.
	(b) 2% Citrate	19	35-45 sec.	20-45 sec.	70 sec.
XVI	(a) 0.9% NaCl	16	30-50 sec.	20-35 sec.	65 sec.
	(b) 2% Citrate	14	65-90 sec.	10-30 sec.	90 sec.
XVII	(a) 0.9% NaCl	16	40-55 sec.	10-20 sec.	65 sec.
	(b) 2% Citrate	46	40-60 sec.	10-35 sec.	65 sec.
XVIII	(a) 0.9% NaCl	13	60-70 sec.	10-15 sec.	75 sec.
	(b) 2% Citrate	29	45-75 sec.	10-20 sec.	70 sec.
XIX	(a) 0.9% NaCl	10	35-45 sec.	25-30 sec.	65 sec.
	(b) 2% Citrate	31	65-80 sec.	10-15 sec.	77 sec
XX	(a) 0.9% NaCl	23	50-65 sec.	10-30 sec.	70 sec.
	(b) 2% Citrate	65	30-40 sec.	10-35 sec.	65 sec.
XXI	(a) 0.9% NaCl	8	60-110 sec.	10-15 sec.	85 sec.
	(b) 1.5% Citrate	24	50-100 sec.	8-12 sec.	68 sec.
XXII	(a) 0.9% NaCl	11	65-100 sec.	5-15 sec.	90 sec.
	(b) 1.5% Citrate	17	70-130 sec.	10-20 sec.	100 sec.
XXIII	(a) 0.9% NaCl	10	50-130 sec.	8-10 sec.	100 sec.
	(b) 2% Citrate	64	30-60 sec.	8-15 sec.	60 sec.

Summary.

Exp.	Filling Under 0.9% NaCl.	Filling Under Citrate	Ratio	Time with 0.9% NaCl	Time with Citrate.	Ratio.
XIV	18	16	1:0.88	22 min.	17 min.	1:0.77
XV	6	19	1:3.16	9 min.	22.5 min.	1:2.5
XVI	16	14	1:0.87	18 min.	26 min.	1:1.4
XVII	16	46	1:2.9	18 min.	54 min.	1:3.0
XVIII	13	29	1:2.2	18 min.	38 min.	1:2.1
XIX	10	31	1:3.1	14 min.	31 min.	1:2.2
XX	23	115 plus	1:5.0	26 min.	116 min.	1:4.1
Avge. with 2% Citrate	14.5	38.5	1:2.6	17.8 min.	43.5 min.	1:2.4
XXI	8	24	1:3.6	14 min.	33 min.	1:2.4
XXII	11	17	1:1.5	18 min.	30 min.	1:1.7
XXIII	10	64	1:6.4	16 min.	48 min.	1:3.0
Average for 1.5% Citrate	9.6	35	1:3.6	16 min.	37 min.	1:2.3
Average entire series	13.1	37.5	1:2.9	17.3 min.	41.5 min.	1:2.3

GROUP IV.

Exp.	Veins Used.	Amount of Blood	Negative Pressure	Positive Pressure	Remarks
IV	From one jugular to other.	100 cc.	-10.5 to.13.5 cm	+ 20 cm. water	Dog's wt. 15 K.
XII	One jugular used for each part of experiment.	100 cc.	-19 to -27 cm	+ 19 to 27 cm	Dog's wt. 12 K.
XXIV	One jugular used for each part of experiment.	100 cc.	-20 to -27 cm	+ 27 to 54	Dog's wt. 12-14 K.
XXV	One jugular used for each part of experiment.	100 cc.	-20 to -60 cm	+ 27 to 40	
XXVI	One jugular used for each part of experiment.	100 cc.	-15 to -65 cm	+ 27 to 54	

Exp.	Sol. in Cylinder.	Num. of Fillings.	Time of Filling	Time of Emptying.	Total Time in Cylinder
IV	(a) .025 gr. hirudin	75	18-90 sec.	7-14 sec.	25-104 sec.
	(b) Ringer's	13	45-75 sec	15-22 sec.	60-97 sec.
XII	(a) Phys. salt	31	25-30 sec.	10-25 sec.	35-55 sec.
	(b) .030 gr. hirudin	42	32-65 sec.	10-30 sec.	42-90 sec.
XXIV	(a) Phys. salt	28	30-70 sec.	10-30 sec.	45-100 sec.
	(b) .030 gr. hirudin	62	50-110 sec.	8-20 sec.	60-120 sec.
XXV	(a) Phys. salt	15	40-55 sec.	10-20 sec.	50-70 sec.
	(b) .030 gr. hirudin	23	34-48 sec.	18-30 sec.	55-70 sec.
XXVI	(a) Phys. salt	13	25-45 sec.	18-30 sec.	50-70 sec.
	(b) .030 gr. hirudin	35	30-60 sec.	20-25 sec.	50-75 sec.

Summary.

Exp.	Fillings Under Phys. Salt	Fillings Under Hirudin Sol.	Ratio	Time Under Phys. Salt.	Time Under Hirudin	Ratio.
IV	13	75	1:5.7	21	54	1:2.6
XII	31	42	1:1.3	21	27	1:1.3
XXIV	28	62	1:2.2	27	92	1:3.4
XXV	15	23	1:1.5	17	25	1:1.5
XXVI	13	35	1:2.6	13	35	1:2.6
Average	20	47	1:2.3	20	46.5	1:2.3

COAGULATION TIME.

The following experiments show that the coagulability of the blood in the recipient is not altered by contact with the citrate or hirudin solution in the blood cylinder during the transfusion. The slight variations in coagulation time even after withdrawing and replacing large amounts of blood are practically no greater than the variations between different observations. In determining the coagulation time a definite amount was taken in the same way each time and kept at a uniform temperature until coagulation occurred.

INDIRECT TRANSFUSION.

The method of indirect transfusion by receiving the blood from the donor's vein into a citrate of soda solution of such strength that clotting is prevented, has simplified the precedure to such an extent that it is practically as easy as an ordinary intravenous infusion of physiological salt solution. Any general practitioner can do this. It does not require an elaborate equipment of special apparatus or special operative skill.

It has been used a sufficient number of times by Weil and by Lewisohn, of New York, to show that citrated blood which has been out of the body for some time is as effectual for transfusion in man as the unmodified blood transferred directly from the vessel of the donor to the recipient.

Those who have practiced this method in man have been able to withdraw enough blood from the veins of the forearm by using a needle or cannula of sufficient size. In our experiments we have obtained best results by tying a glass cannula

Exp. VI. Dog's Wt. 18 Kilos. Vol. of Blood Equal 1,300 cc.

3:30 p. m.	Normal coagulation time	2 mins.
3:40-4:05	Transfused 2,400 cc. under 1.5% citrate.	
4:11-4:40	Transfused 3,600 cc. under 2% citrate	
4:45	Coagulation time (after transfusion of 4.5 times the total volume of blood)	2 min. 40 sec.
4:47-5:14	Transfused 1,600 cc. under Ringer's Sol	
5:15	Coagulation time	2 min.

Exp. VII. Dog's Weight Equal 20.4 Kilos. Vol. of Blood Equal 1,490 cc.

3:40 p.m.	Normal coagulation time (2 observations)	2 min; 2 min.
3:54-4:41	Transfused 6,500 cc. under 2% citrate.	
4:45	Coagulation time	3 min; 2 min. 50 sec.
4:49-5:17	Transfused 2,300 cc. under 1.5% citrate.	
5:18	Coagulation time (after transfusion of 6 times total volume of blood)	2 min. 15 sec; 3 min.

Exp. VIII. Dog's Weight 14.5 Kilos. Volume of Blood 1,056 cc.

10:45 a. m.	Normal coagulation time (2 observations)	2 min. 30 sec; 2 min. 45 sec.
10:55-11:37	Transfused 7,100 cc. under 0.9% NaCl.	
11:40	Coagulation time	3 min. 15 sec.; 3 min. 15 sec.
11:45	Accidental hemmorrhage (accounting for increased coagulability in next observation).	
11:57-12:17	Transfused 1,600 cc. under 2% citrate.	
12:20	Coagulation time	2 min; 1 min. 30 sec.
12:30-1:04	Transfused 2,100 cc. under 1.5% citrate.	
1:10	Coagulation time	2 min. 45 sec.; 2 min. 30 sec.

Exfl IX. Dog's Weight 15 Kilos. Vol. of Blood, 1,170 cc.

3:15	Normal coagulation time	2 min. 15 sec.
3:24-4:18	Transfused 7,500 cc. under .025 gr. hirudin.	
4:20	Coagulation time after transfusion of 6 times the volume of blood	3 min.

coated with paraffin in the vein of the donor. A glass cannula can be conveniently coated with a thin film of paraffin by using a solution of paraffin in ether. In these experiments on dogs the external jugular vein was used. Probably the venous pressure in the external jugular vein of animals is not as great as that in the vein of the forearm in man with a tourniquet tied about the arm. This probably explains why a needle is satisfactory for transfusion in man and not in animals.

It is important that *the needle used to withdraw the blood from the donor's vein should be large enough for the blood to flow freely in a continuous stream* as soon as the cannula is introduced. If it only escapes drop by drop, or only flows in a continuous stream for a short time by the aid of aspiration, it is impossible to get enough blood on account of the clotting in the cannula.

Aside from the difficulty in getting enough blood, the blood clots in the needle or cannula when it flows slowly. When clotting once starts in that way, there is danger of the entire mass of blood clotting after it has mixed with the citrate. The writer has on three occasions seen delayed coagulation in the citrated blood as the result of sluggish flow from the donor's vein, after the citrated blood had been poured through gauze. In each case a considerable time had elapsed after its removal from the body and its mixture with the 2 per cent. citrate solution in such proportion as to give a strength of 0.2 per cent. sodium citrate.

In one experiment coagulation occurred during an injection and the dog died suddenly with extensive thrombosis of the veins, and right heart. As the right auricle was filled with filaria in that dog it was impossible to determine what influence their presence had upon the intravascular coagulation.

It is very clear, however, that a free flow from the donor's vein is essential to the success of indirect transfusion. Any delay allows some blood to clot before it mixes with the citrate solution. The formation of a small amount of thrombin in that way may coagulate the entire mass after it has mixed with the citrate. This constitutes the greatest danger of indirect transfusion, viz., intravascular clotting or thrombosis. It is improbable that coagulation could be prevented under such circumstances even by 0.3 per cent. or 0.5 per cent. sodium citrate mixture.

Lewisohn states that it is immaterial what size needle is used for the injection of blood, but it is very important that a large size cannula should be used in taking the donor's blood. Our experiments confirm his observation. Lewisohn used a Kaliski[19] cannula, gauge 11 B. & S., and

was able to withdraw 500 cc. in five minutes. The injection may be like an intravenous injection of physiological salt solution or of salvarsan.

At first we attempted to use the needle of a Record syringe to withdraw blood from the donor's vein. We then used a Lindemann needle, but it sometimes produces a thrombus from the injury to the vein. We were not able to withdraw more than 400 to 600 cc. of blood by it without a clot. In the later experiments a glass cannula, the inner surface of which had been paraffined, was tied in the vein. This seemed preferable to the delay in withdrawing the blood by a needle and the danger of a thrombus by repeated puncture.

As small clots are apt to be carried into the bottle containing the citrate solution from the cannula or needle used to withdraw the blood from the donor, it is desirable to pour the citrated blood through several layers of sterile gauze, wet with physiological salt solution, before it is introduced into the recipient's vein. Small clots are frequently found on the gauze, showing that this precedure avoids the danger of embolism and thrombosis.

We have used bottles of 300 cc. capacity and have calibrated them up to 250 cc. The blood is received directly into such a bottle containing 25 cc. of 2 per cent. solution of sodium citrate, until it is filled up to the 250 cc. mark. The vein is then compressed by the fingers while the end of the cannula is shifted to another bottle until the desired amount has been withdrawn. It is better to use several bottles of small size containing just enough citrate to give a strength of 0.2 per cent. to the mixture. That avoids an excess of the citrate in case the flow of blood is unexpectedly interrupted by a clot.

In our experiments a strength of 0.2 per cent. sodium citrate has been sufficient to prevent coagulation. These results confirm the observations of Lewisohn and show that it is not necessary to use a strength of 1 per cent. sodium citrate to prevent coagulation as used by Weil in his earlier transfusions by the indirect methods. Perhaps it would be better to use 0.3 per cent. citrate. Sodium citrate is non-toxic when used in the proportion of 0.3 per cent. for a transfusion of 1,000 cc. of blood. Ordinarily the amount transfused in man does not exceed 750 cc. When the blood is to be kept several days for an emergency, or for repeated injections, it is desirable to use 0.3 per cent. sodium citrate as the blood may clot after one or two days in a mixture containing 0.2 per cent. sodium citrate.

It is convenient to use a two per cent. solution of the sodium citrate, as it simplifies the calculation by mixing it with blood in th eratio of 1 in 10. For a 0.3 per cent. mixture a 3 per cent. solution of sodium citrate could be used in the same proportion.

Our experiments have also undertaken to determine the lethal dose of sodium citrate per kilo of body weight. In the first four experiments a 5 per cent. solution was injected and the lethal dose with it varied from 0.5 to 0.8 gram per kilo of the body weight; in the last three experiments a solution of less concentration was used (2. per cent.), and the lethal dose varied from 0.835 gram to 1.24 gram per kilo.

These results show that sodium citrate is not as toxic as Lewisohn was led to believe. He injected a 10 per cent. solution in three dogs and found the toxic equivalent 0.3 gram per kilo. When the injection is made slowly and in the dilution used for indirect transfusion, sodium citrate is quite harmless. It is only toxic when a concentrated solution is injected into a vein rapidly. For practical purposes the use of sodium citrate for indirect transfusion is quite safe and entirely free from danger.

Naturally the question arises, What effect does it have upon the coagulability of the blood? In three of our experiments we determined this by Cannon and Mendenhall's method[20] based upon the fluidity of the blood. Our results confirm the observations of Weil and Lewisohn, viz., that the coagulability is increased for a very short time immediately after the transfusion and then it gradually returns to normal. While the citrated blood remains fluid outside the body for days, its injection into the veins does not lessen the coagulability of the circulating blood. In fact, Lewisohn and Weil have found that the coagulability of the blood is not decreased even in men suffering from hemorrhagic diseases. It can be considered well established that it is quite safe and does not destroy or even lessen the coagulability of the blood.

Summary of Experiments on Indirect Transfusion and Lethal Dose of Sodium Citrate.

Time	Amount and Concentration of Solution Used.	Total Amount of Citrate	Lethal Dose per Kilo.	Remarks
	Exp. I. Dog's Wt. 10 k.			
10:10 to 10:25	Injected 160 cc. 5% Sod. Citrate intravenously.	8.0 gr.	0.8	Extensive fibrillar contractions of muscles. Heart continued 2 min. after resp. ceased.
	Exp. II. Dog's Wt. 8.64 k. Vol. 630 cc.			
	Transfused 400 cc. blood indirectly in 50 cc. 2% Sod. Citrate Injected 80 cc. 5% citrate	1.0 gr. 4.0 gr.	0.58	Heart cont. after resp. ceased.
	Exp. II. Dog's Wt. 8.64 k. Vol. Blood 630 cc.			
2:40 to 2:50	Transfused 560 cc. blood indirectly in 75 cc. 2% citrate Injected 50 cc. 5% Sol. Sod. citrate	1.5 gr. 2.5 gr.	0.73	
	Exp. IV. Wt. 8.3 k. Vol. Blood 605 cc			
3:10 to 3:15	Transfused 650 cc. blood indirectly in 100 cc 2% citrate Injected 42 cc. 5% So. Sod. citrate	2.0 gr. 2.1 gr.	0.494	
	Exp. V. Dog's Wt. 15.45 k. Vol. Blood 1,126 cc.			
10:40				Normal coag. time 4 min. 30 sec.
11:03 to 11:23	Transfused 1,350 cc. blood indirectly in 150 cc. 2% citrate	3.0 gr.		
11:25				Coag. time 3 min. 30 sec.
11:35 to 12:10	Transfused 1,350 cc. blood indirectly in 150 cc. 2% citrate	3.0 gr.		
12:15				Coag. time 4 min. 00 sec.
12:20 to 12:26	Injected 100 cc. 2 % citrate	2.0 gr.		No effect.
12:32 to 12:54	Injected 150 cc. 2% citrate	3.0 gr.		Resp. slow and irregular.
12:57 to 1:06	Injected 100 cc. 2% citrate	2.0 gr.		Resp. slow and irregular.
1:10 to 1:20	Injected 100 cc. 2% Citrate	2.0 gr.		Resp. slow and irregular.
1:20 to 1:24	Injected 25 cc. 2% citrate	.5 gr.	1.0 gr. per kilo	Resp. slow and irregular.
1:25	Total	15.5 gr.		Resp. ceased.

CONCLUSION.

1. Sodium citrate is a satisfactory anti-coagulant when used in the cylinder for direct transfusion in two per cent. solution. Transfusion can be continued from 2.5 to 3 times longer with a two per cent. citrate solution than can be done with physiological solution.

2. A solution of sodium citrate is as efficient as a solution of hirudin, as shown by the amount of blood transfused or by the time of transfusion.

Time	Amount and Concentration of Solution Used.	Total Amount of Citrate	Lethal Dose.	Remarks
	Exp. VI. Dog's Wt. 18.07 k. Vol. Blood, 1,318 cc.			
3:00				Normal coag. time 3 min.
to				
3:05				Normal coag. time 3 min.
3:12	Transfused indirectly 2,700			
to	cc. blood in 300 cc. 2% ci-			
3:32	trate	6.0 gr.		
3:35				Coagulation time 3 min.
3:50	Transfused indirectly 2,700			
to	cc. blood in 300 cc. 2% sod.			
4:22	citrate	6.0 gr.		
4:25	Transfused 225 cc. blood in			Coagulation time 3 min.
to	25 cc. 2% citrate	.5 gr.		
4:35				
4:40	Injected 130 cc. 2% Sod. Cit.	2.6 gr.	0.835 gr.	
to				
4:54		15.1	per kilo.	
	Exp. VII. Dog's Wt. 6.0 k. Vol. Blood, 437 cc.			
2:20				Normal coag. time 6 min.
2:40	Transfused indirectly 900 cc.	2.0 gr.		
to	blood in 100 cc. 2% Sod.			
3:04	citrate			
3:10				
3:15	Clot in cylinder			Coagulation time 4 min. 30 sec.
to				
3:30				
3:35	Transfused 175 cc. blood in	0.5 gr.		
to	25 cc. 2% citrate.			
3:45				
3:45	Transfused indirectly 900 cc.	2.0 gr.		
to	blood in 100 cc. 2% citrate			
4:20				Coag. time 8 min. 30 sec.
4:30				Resp. shallow.
4:40	Transfused indirectly 560 cc.	1.25 gr.		
to	blood in 62.5 cc. 2% citrate			
4:50				
4:55	Injected 100 cc. 1%	1.0 gr.		
to				
4:57				
4:57	Injected 70 cc. 1%.	0.7 gr.		
to				
5:02				
	Total blood transfused 2,535, or 6 times blood of body.	Total citrate 7.45 gr.	1.24 gr. per kilo.	

3. Sodium citrate does not lessen the coagulability of the blood and is not toxic in the amount used either for direct or indirect transfusion.

4. The coagulability of the blood is temporarily increased immediately after transfusion in which sodium citrate is used, either by the direct or indirect methods.

5. The lethal dose of sodium citrate in dogs is about 1.0 gram per kilogram of body weight when dilute solutions are injected. Even when a concentrated solution is used it is not more than 0.5 gram per kilogram. A 0.2 or 0.3 per cent. solution of sodium citrate is sufficient to pre-

vent coagulation and does not have any toxic effect in the amount used for indirect transfusion in man.

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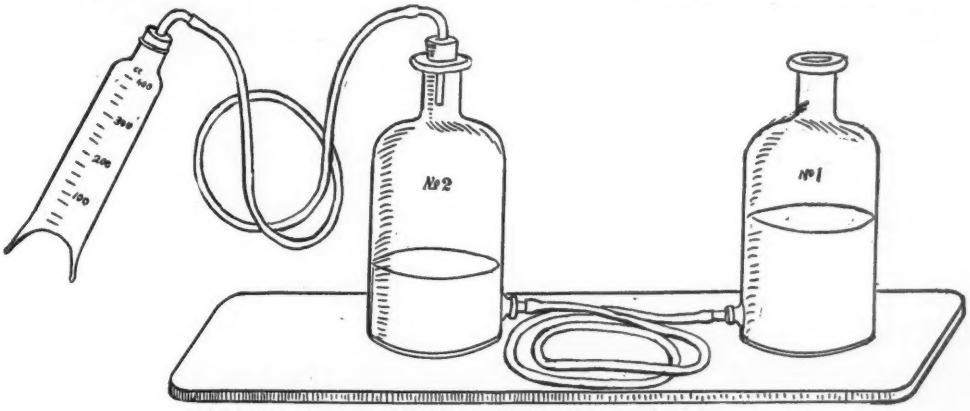
Discussion of this paper follows next paper.



Illustrating Papers of Both Dr. Carter and Dr. Singleton.

A RELIABLE METHOD OF BLOOD TRANSFUSION, WITH REPORT OF CASES*.

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Finding the older methods of transfusion, particularly with Crile's tubes, unsatisfactory, more than two years ago we began some experiments to test certain methods reported, endeavoring to find something satisfactory for our use. With Dr. Carter, extensive experimentation was gone into in his laboratory, of which he has reported at this meeting. The following method was developed, and clinically with Dr. Thompson, we have found it entirely reliable. We have followed the method of David and Curtis[1], in the main, but certain modifications of the technique were found very advantageous. The apparatus and method of use is briefly given as follows:

A glass graduated flask or container, open at the top, with the bottom drawn out into two arms, or in a "U" shape, is used. The two ends of the "U" are inserted into the donor's and recipient's veins, respectively. A rubber connecting tube leads from the top of the container to the pressure bottles. These bottles, the use of which was suggested by Dr. Carter, are a decided improvement over the syringe as used by David and Curtis. They give a more uniform pressure, exerted continuously, over a longer period of time, and the pressure can be changed from positive to negative, and vice versa,

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more rapidly. A glance at the cut or drawing of the apparatus will show how it is manipulated. A fair sized rubber tube connects the bottoms of the bottles, and one bottle is connected at its top with the glass container. The mouth, or top, of the other bottle is open. One is placed on a table, the other one, the top of which is open, is raised or lowered, the water flowing from one bottle to the other, producing a positive or a negative pressure, as desired. The glass container is sterilized, dried and coated with paraffin or paraffin and vaseline, in the following way. The paraffin is boiled and allowed to cool down some. With the pressure bottles attached, the container is aspirated full of melted paraffin, and then it is forced out, which leaves a thin coating on the inner side. If the coating seems too thin, repeat the process. It is then laid aside until the veins are gotten ready.

Under local anesthesia of novocaine, ¼ of 1 per cent., the veins are exposed and carefully liberated, being extremely careful not to bruise the veins by handling. It may be necessary to follow up the brachial vein for some distance to get sufficient length of large vein without branches, particularly in the donor. The arms of the patients are brought together, a small tourniquet is placed under the donor's arm, and a strand of catgut and a strand of linen are placed under each vein. The vein of the donor is tied with the catgut proximally, a small rubber covered clamp applied distally, the vein cut across, flushed out with citrate sol., and being held open with mosquito forceps, the cannula is inserted and tied in with the linen. The recipient's vein is tied distally, the rubber covered clamp applied proximally, the vein cut near the ligature, flushed out and the other arm of the flask tied into it. Through the top of the container about 50 cc. of 1½ per cent. sodium citrate sol. is poured. One assistant tightens the tourniquet, while the stopper connection is quickly made. The clamp is removed from the donor's vein, the pressure bottle lowered to produce a negative pressure, and the blood rushes up in the container. When 150 to 200 cc.'s of blood have risen in the flask, the vein of the donor is pressed between the thumb and finger, the pressure reversed from negative to positive, the clamp removed from the recipient's vein, and the blood forced out, until about 50 cc.'s of fluid is left in the flask. Then the process is repeated. It is very important that the blood be kept moving, and if the blood comes into the flask slowly it is better to force it out frequently; while if you have a good flow of blood you may receive more than 200 cc.'s in the flask before forcing it out. The donor can cause a much faster flow of blood by closing and opening his fist as the flask is filling.

We have done ten successful transfusions. In our first attempt we were able to get only 75 cc.'s of blood, and failure was due to the fact that the patient was almost moribund, the vein selected was very small, and the intima was injured in forcing the cannula into the vein. Of the successful transfusions, the smallest quantity of blood transfused was 750 cc.'s, and the largest quantity was 1,250 cc.'s. In the first two we were forced to stop after 750 cc.'s had been transfused owing to a clot in the container. After we began using the pressure bottles instead of the syringe, and also began using the sodium citrate instead of the salt sol., we were able to proceed until we had as much blood as we desired.

At present there are many new methods reported daily in an endeavor to simplify transfusion. As yet, no method has proven entirely satisfactory and simple enough to make it universally accepted. The method described here, we must admit, is not simple, but can be relied upon to transfuse any quantity of blood desired with perfect safety to the patient. The sodium citrate method as used by Lunisohn[2], I believe, promises to play an important part in simplifying transfusion of blood, notwithstanding that recently Simons[3] reports unfavorable results by using this method. I will not attempt at this time to discuss the value of transfusion as a therapeutic measure. The results obtained in various diseases, by transfusion, reach us with such variable reports that we still feel that we have much to learn. In patients suffering from the loss of blood, transfusion has its place, beyond doubt; and it is in these cases that the most brilliant results are achieved. Of our transfusions, three were for pellagra, two pernicious anaemia, one pueperal sepsis, one pernicious malaria, and

three for hemorrhage. It is sufficient to say, here, that the three cases who were transfused for hemorrhage showed rapid improvement and were cured. The one for pernicious malaria showed a marked improvement and is still under observation, the transfusing being done only a few days ago. Of the other cases, none recovered. Of these, four were males and six females. In none of our cases were there any serious unfavorable symptoms as a result of transfusion, either to the donor or to the recipient except in one instance, which I will mention later.

THE DONOR.

The selection of the donor, in all cases, is of the greatest importance. It has been well proven that hemolysis is to be dreaded in transfusion. The donor's blood may be hemolytic to the recipient, and again the recipient's blood may hemolyse the foreign blood. [4]A quick method of testing the prospective bloods is described by Rous and Turner[5]. In the majority of our cases, I am sorry to say, we did not make agglutinin or hemolitic tests and offer the excuse that the cases were desperate, requiring immediate attention, and again that the donor procured, in each of these cases, was the only one available. When time and other conditions will permit, Wasserman, hemolitic and agglutinin tests should be made; but when these can not be had, and where a relative, that is, son, daughter, mother, father, brother or sister can be used as a donor I would not hesitate to proceed with the transfusion without the tests; for blood of near kin is perfectly compatible in a great percent. of cases. In one case, of pernicious anaemia, a brother was used as a donor in the first transfusion, while in the second transfusion the blood was from a friend and not a relative, and following this, on the second day, this patient developed a temperature of 101 degrees, which remained for several days, with some slight hemorrhage from the nose, and evidently some hemolysis occurred. This was the only reaction of any kind unfavorable, and we used the following donors:

In four cases, the husband.
In one case, the daughter.
In two cases, a brother.
In three cases, a non-relative.

The veins selected. We have found that our success depends largely upon getting access to suitable veins. They must be large enough to receive the cannulas without traumatism to the intima. In our cases we have used the veins of the arm, in all the donors, satisfactorily; but in the recipients, in some cases the veins of the arm were too small; and in these cases we have not hesitated to use larger veins. In two cases, where the patients were very sick, we used the femoral vein and found it very accessable in Scarpa's triangle. In two other cases we used the long saphenous vein. In these cases the patients are brought side by side on two tables, the head of one to the foot of the other, the arm of the donor being brought across the thigh of the recipient, and in this position the connection made. There were no bad after effects from injury of these veins. In the majority of cases the veins of the arm will serve the purpose, and should be used where it is possible.

I am indebted to Dr. J. E. Thompson for the privilege of reporting these cases.

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DISCUSSION.

Papers of Drs. Carter and Singleton.

Dr. H. R. Dudgun, Waco, Texas:—I want to express my appreciation to Dr. Carter and to Dr. Singleton for the presentation of this subject.

I have had something to do with blood transfusion for a number of years, and it has been one of the most unsatisfactory operations that I have ever attempted to do, and has been about as unsatisfactory in the hands of others that I have witnessed doing the operation.

The first transfusion that we attempted was by means of Crile's method, in which we have to get the artery rather deeply, and which, in my hands, and in the hands of those that I have witnessed doing the work, clotting has been an exceedingly troublesome condition.

Then, the use of Bernheim's tubes has not been very satisfactory, on account of clotting, nor has the anastomosis between the artery and vein by means of sutures, on account of clotting.

If this method proves to be a success, it will be an exceedingly valuable procedure, for the simple reason that a transfusion of blood into a person that has become exsanguinated by hemorrhage will very often save life, and will be, per-

haps, of therapeutic value in other connections. There is some objection to taking blood direct from the vein and injecting it into the recipient. It is urged that the blood is laden with germs from the donor, and that the patient is in need of blood from which all of the impurities have been discharged, and that is the most serious objection that can be offered in the transfusion from vein to vein, but there are so many advantages offered by this method of transfusion that I believe it will entirely overcome any objection that can be urged against it.

Again, I want to express my appreciation of these papers by Doctors Carter and Singleton.

Dr. Lucian H. Landry, New Orleans, La.:—We are all more or less interested in the subject of transfusion.

The apparatus exhibited by Dr. Carter is an ingenious one and the only possible serious objection (speaking off-hand), is the probability of the blood remainng in the transmitter too long. Of course, with the addition of the citrate he obviates, to some degree, the possibility of clotting. However, I wish to add just a few words and exhibit the Unger apparatus, which is being used a great deal at the Mt. Sinai Hospital in New York. It is a great deal quicker than the citrate method and the blood does not remain long in the syringe.

By the aid of a two-way stop-cock, the veins are kept distended by either blood or saline. When the blood is being gently aspirated from the donor, the saline is flowing slowly to the recipient, and vice versa—when the blood is being injected to the recipient, the saline is flowing into the vein of the donor, by simply switching the stop-cock. The advantage of this method is the short space of time the blood remains in the syringe. Dr. Unger told me that he auto-transfused a dog until he got tired, and had no clotting or leakage.

When I first looked at the apparatus, I thought the two-way stop-cock was a mixing chamber; this, of course, would be quite a drawback or disadvantage. The only part of the apparatus that comes in direct contact with the blood, are the two little tunnels in the stop-cock and the rubber tubes and, of course, the canulas.

To prevent coagulation in the syringe, a continuous ether spray is kept playing on the syringe, following the piston, thereby preventing expansion of the piston and obviating blocking of the syringe.

Dr. James E. Thompson, Galveston, Texas:—I have been greatly interested in this subject for many years. Primarily, I was concerned in the development of the operation of transfusion from a practical standpoint, because I found in my early work that it was not an easy matter to perform transfusion with Crile's tubes and be absolutely certain as to the outcome. In some of my earlier cases I failed to transfuse on account of the rapid clotting of the blood. In my later cases, clotting did not occur, but I was always doubtful as to the quantity of blood that had passed from the donor to the recipient. This uncertainty made me resort to the use of the aparatus known now as that of Curtis & David. It took us a little time and experimentation to understand accurately the conditions which determined success or failure, and as occurs always in this class of work experiments on animals seem to be absolutely necessary before one can obtain sufficient skill to use it on the human body.

We are greatly indebted to Prof. Carter for his help in this direction and for the freedom of the physiological laboratory in the University of Texas.

As regards the use of the Curtis apparatus, it seems to be, at the start, a little unwieldly. It cannot be put in your coat pocket and carried with ease, and this is, of course, a very great disadvantage. It requires to be very carefully prepared, and each step of its use requires the greatest circumspection. If one link of the chain of preparation is defective, the process will probably be a failure. Dr. Singleton, in his paper, gave you, in a very concentrated way, the method of use of this apparatus, and it would be well to remember that it is not wise to deviate one hair's breadth from the directions given.

We have found, in our later work, that we can invariably use, with safety, a vein the size of the basilic in the donor, but this vein, in the recipient, is, as a rule, not large enough for our purpose. We have, therefore, never hesitated to expose the fermoral vein in Scarpa's triangle and employ this.

Personally, I am always anxious as to the success or failure of this operation, and I always heave a great sigh of relief when I see the blood from the donor passing into the receptacle and from the receptacle into the vein of the recipient. We have been particularly happy in our last series of transfusions, not having experienced a single failure.

During the summer I had the opportunity of helping Prof. Carter with a series of experiments in transfusion, in which he was demonstrating the use of citrate of soda solution as a preventor of coagulation. These experiments he has given to you, in extenso, from a laboratory point of view. So far we have not employed this method in surgery on human beings. This method is extremely simple, requires very little technical skill, and has practically no element of uncertainty. If it can be utilized in transfusions from one man to another (and there is great reason to believe that it can be so utilized safely), it will simplify the operative precedure immensely. It will do away with the necessity of having donor and recipient fastened together. The donor and recipient can be lying in separate rooms and the blood can be drawn from the donor into the solution of citrate of soda, filtered, and brought into the room where the recipient is lying, and poured into the funnel that communicates directly with the recipient's vein. In an emergency the blood could even be brought from a distance, or could be kept over-night, or even for a longer period. The possibilities of this method are very fascinating, and I am awaiting somewhat anxiously the outcome of further experiments along this line.

One particular point I was much interested in (because it seemed to me to be of the greatest importance), was that of determining the question of the coagulability of the blood of the recipient, after the blood of the donor, mixed with the citrate of soda solution, had been transfused. Theoretically, it might have been inferred that the coagulability of the recipient's blood would be greatly decreased, in which event, transfusion

performed in this manner would be unjustifiable in cases of severe hemorrhage. To our great pleasure, we found that the coaglulation time was not interfered with. Even after extensive transfusions performed on dogs, in which large quantities of citrate of soda had been poured into the vascular channels, the blood still coagulated as rapidly as before.

Lastly, we considered the question as to the lethal dose in a human being, but we found it impossible to approach anywhere near the lethal dose of citrate of soda. In the experiments performed on dogs, the whole quantity of blood was transfused again and again, as much as three or four times, being mixed each time with citrate of soda, and the lethal dose was never even approached. I think that we can safely say that there is no danger in this direction.

Dr. Chas. H. Harris, Fort Worth, Texas:—I cannot refrain at this time from thanking these two doctors for presenting this subject as they have, in such an attractive way. It is certainly very educational and inspiring. Notwithstanding this, there are a number of very debatable questions. The first thing that presents itself is that we have to have a very complicated piece of machinery to do this, and it takes a great deal of skill to operate it. That is the thing we would like to get away from. The times I have needed transfusion most in surgery were when I needed the apparatus and could not use it. I do not want to say one thing in the world that will take one thing from this, because it is certainly very instructive and very valuable to us.

As to the objections to hemolysis, I think that that is very slight. I have had the opportunity to observe a number of tranfusion operations, and have never yet met with that trouble, and unless it is for therapeutic purposes, the conditions in which we want to do our transfusions, we have not the time to see whether the blood is haemolitic or not.

A method which I have met success with, and which is very simple, is that of telescoping the radial artery into some suitable vein, which is the simplest and easiest way that I know to do it. First put in three guy sutures into the vein, pass up about three-quarter inch above it, pass the suture down through the end of the vein, catch the artery, bring it back through near the same place —a mattress stitch. You can telescope the artery into the vein, and this stitch will give you such a union as gives you very little leakage.

The doctor brought out one point that is very essential to any kind of blood vessel work, that I have ever undertaken, and that is that we should do no trauma to the walls or to the field. We must have the field clear of blood. I do not believe that we understand the theory of coagulation. If it is thrombo-caries, generally in the adventitia, or if it is in the blood vessel wall, or in the structures, we notice we get rapid coagulation of blood by any method, without any trauma or the blood coming in contact with any tissues that have been traumatised, but we do know that blood in the field or trauma, does enhance coagulation. One of the advantages that I see, you can save the radial artery, which is objectionable, very often, when you have to destroy the artery, which could be saved by an end-to-end anastomosis, which is rarely necessary; but the main objection that I see to this thing, the technique is very difficult, and the only lesson that I get from this is that all these methods must be pursued by some laboratory doing experimental work.

Dr. A. D. Folsom, Dallas, Tex:—I wish to compliment the authors upon these two papers.

One thing I would like to ask Dr. Singleton to elaborate on: If I understand his technique correctly, he places a small amount of sodium citrate solution in the bottle, to begin with. It just occurs to me that most of that would be taken out with the filling of this blood in this tube, and if that is the case, the subsequent fillings of the bottle will not have any solution in the bottom at all.

Blood vessel suturing sounds mighty easy on the floor, but when you begin to do it, it is an entirely different proposition. I know the first one I attempted I made an utter failure of, and I begged them to let me do it again, assuring them that I had done it a sufficient number of times to be proficient at it, but failed again, and did not have the nerve to ask them to let me try it the third time.

Dr. J. Shelton Horsley, Richmond, Va.:—I am greatly disappointed that I was not able to hear these papers, but I had the privilege of talking to Dr. Carter and have been studying the charts.

As I gather, Dr. Carter seems to prove that the citrate solution—not stronger than 2 per cent., is practically without injurious effect in any reasonable amount.

There are one or two things that I would like to call attention to, however. One is this: I notice in those charts that each time after using the citrate solution coagulation time is decreased. Of course the citrate solution prevents coagulation ordinarily when the blood is in vitro. When you put it in vitro it accelerates coagulation, and it means that there must be some chemical action somewhere that turns loose some material from which fibrin ferment is formed, because this is built up from injured cells. If you have a solution which, in a test tube will prevent coagulation of the blood, or, at least, retard it almost indefinitely—a day or two—and if you take the same solution and put it in circulation and find that the coagulation is increased, it seems to me reasonable to reach the conclusion that this solution produces some destructive effect upon the cells of the blood, which causes not only the normal increase in rapidity of coagulation, but causes an increase which is more than normal.

Another point is this. Arterial suture has been rather frequently exploited. People are unconsciously trying to make it appear more difficult than it is. I do not believe arterial suturing is much more difficult to do than intestinal suturing. Certainly any surgeon of average ability who will try arterial suturing experimentally a sufficient number of times by any of the simplest techniques, can do a transfusion by that technique.

We know little about the physiological chemistry of the blood. We don't know just what the physiological chemistry of coagulation is. We have to suppose two or three things to explain that gross process. We know that the nutritive powers of blood are capable of minute and delicate changes, much more delicate than clotting is;

therefore, it seems probable that there may be some changes incapable of detection by chemistry which render blood less nutritious and less desirable when it is mixed with a foreign solution, or when it leaves the endothelial lining of the blood-vessels. The ideal way is to have rich, oxygenated arterial blood transferred directly over an endothelial surface from the arterial system of the donor to the venous system of the patient. The chief objection to this method is the question of technique, and, as I have already said, a little extra work in animal experimentation will give the technique.

As to measuring the amount of blood transfused, this does not impress me as being an essential requirement. The blood should be transfused fairly slowly and until the patient shows improvement, or the donor shows distress. This may be two ounces, three ounces, ten ounces, or sixteen ounces. Clinical improvement is what we wish to attain in the transfusion, not a measurement of the amount of blood.

Dr. M. Y. Dabney, Birmingham, Ala.:—Personally, my transfusions only number about seven, and hence I feel some hesitancy in discussing the subject before such men as Dr. Horsley and others. However, I would like to say a word in behalf of the Lindeman method of transfusion, although it has been criticised by the essayist.

The method we have just heard described sounds rather diffcult and would seem to necessitate previous experience, although Dr. Carter said that his effort had been to develop a method that any practitioner could use. I feel certain that not only the average practitioner could not follow his instructions, but that the average surgeon among us could not do so until he had developed the technique upon animals, which, as desirable as it may be, is not possible in every instance.

The Lindeman method is essentially a non-operative procedure, and that point cannot be too strongly emphasized. Every other method discussed here today has involved an operation. Lindeman's plan is analogous to the technique of introducing salvarsan, or taking a blood culture, or removing blood for a Wasserman. There need be no scar because only in very rare instances is it necessary to cut down upon the vessel. But one of Lindeman's cases came to autopsy (many days after transfusion), and at that time careful examination revealed not the slightest indication of where the needle had been introduced into the vessel.

Any of you who have ever tried to secure donors for patients in a charity hospital will recall the difficulty sometimes met with in finding some one ready to furnish blood. But the problem becomes much more simple when you are able to say: "I want to put a needle under your skin; I am not going to cut you; and I will promise that there will not be a knife in the room."

One objection that has been raised is that "it requires five or six assistants." A man with a little experience gained from taking blood for Wassermans through a Lindeman needle will not need so much help when the time arrives for transfusing.

Bernheim, of Baltimore, has designed a stillette which very closely fits the larger or outer cannula of the Lindeman needle. By inserting these stillettes after he has introduced the cannulae no space remains in which coagulation may take place in the instrument. That obviates the necessity of keeping saline running through the tubes when blood is not flowing. Bernheim claims that with his stilletes he can do a Lindeman transfusion alone. He has used them a number of times on dogs, but when I talked with him some months ago he had not then tried them on human cases.

Dr. Urban Maes, New Orleans, La.:—It seems to me that the methods of transfusion have not become simple enough for use as a general therapeutic measure. The apparatus and the technique are still too complicated to be of use by any but a few men in institutions.

My own experience has been rather satisfactory with the Kimpton-Brown tube. The last method, which I have not had occasion to try as yet, has come from Dr. Elsberg in New York, and has been used with success by Dr. Levison, and seems to me to be one of the practical sugestions.

It is a syringe method with two needles, some saline solution to prevent the entrance of air and an ether spray played on the syringe to keep the blood cold. The nearer you keep the blood to the freezing point, the slower the coagulation. With a 20 to 40 cc. syringe we should be able to transfer large amounts of blood in a short time.

As this suggestion only appeared about four weeks ago, there has not been time for a thorough trial, but I feel that this suggestion of Levison is both simple and practical.

Dr. W. S. Carter, Galveston, Texas:—In answer to a question as to the time the blood remains in the cylinder, I would say that early in our experiments it was found very desirable to empty the blood out of the cylinder every minute. If the blood is kept in the cylinder for more than one or one and one-half minutes, clotting will soon occur even with the citrate solution.

It is very necessary to pay close attention to the time the blood is kept out of the body, even if one puts over less than 100 cc. at a time. The citrate solution in the cylinder can only mix with the blood by diffusion and therefore can not prevent coagulation in the cannula. In expelling the blood from the cylinder after each filling, the 50 cc. of two per cent. sodium citrate remains. As it has a lower specific gravity than blood, it remains on top and only mixes with the blood by diffusion. Even if all of it were carried over into the recipient's vein it can not have any toxic effect in that amount.

Recently an article appeared in the Journal of the American Medical Association for October 16, 1915, by Dr. Irving Simons in which the indirect method of transfusion is condemned. In one of his cases alarming symptoms developed as soon as 100 cc. of citrate blood had been transfused; in another case after 200 cc. had been injected. It is impossible to produce symptoms of shock by such small amounts of sodium citrate. Evidently the donor had not been carefully selected and his blood was incompatible with that of the recipient. That is the greatest danger in transfusion. On one of the cases reported by Dr. Simons, Crile's method of transfusion had been used before, in another case after the indirect

transfusion. The report does not state that the same donors were used, or that preliminary examinations of the blood had been made to eliminate the possibility of agglutination and hemolysis. Unless that is done it is unfair to make comparisons or to draw definite conclusions as to the merits of any method.

Dr. Horsley has brought out the point that the changes which the blood undergoes outside the body are not understood and that slight changes might make the indirect method of transfusion less desirable than a direct method, especially by anastomosis of the blood vessels.

The citrate does not seem to produce a serious change in the blood. It merely makes the calcium of the shed blood unavailable for clotting. The coagulability of the blood is changed quite as much after transfusion by Lindeman's method as it is after either direct or indirect transfusion by means of the citrate.

In our method of direct transfusion, two precautions are essential for success, viz: (1) to see that the lumen of the cannula is not made too narrow when it is coated with paraffin, and (2) that the vein is handled carefully to avoid injury to the intima.

We do not contend that our method of direct transfusion is simple, but that it is better than the method used by Curtis and David on account of the citrate solution used in the cylinder. It is certainly much simpler for the general practitioner than the anastomosis of blood vessels. The latter can only be used by surgeons who have considerable operative skill.

By far the simplest and most desirable is the method of indirect transfusion by means of a 0.2 per cent. mixture with citrate of soda to prevent clotting. It is not a surgical procedure. It is so simple that any general practitioner ought to be able to do it.

Special apparatus is not required. Two needles and one or two graduated bottles are all that is required. The kind of needle is far less important than the size. It should be large enough to allow 100 cc. of blood to escape from the donor's vein per minute. If the blood does not flow in a continuous stream, clotting may begin before it can mix with the citrate solution. The needle by which the citrated blood is injected need not be so large.

Formerly two or three hours were required to determine the compatibility of the blood of the donor and recipent, but the simple method devised by Rous and Turner makes it possible to do so within a half-hour.

Ottenberg and Kaliski found the blood of 17 out of 128 patients, or 13 per cent., was actively hemolytic for the blood of several donors. This shows the importance of such preliminary blood examinations. These should be made, even when a member of the recipient's family is the donor, if the accidents of transfusion are to be avoided.

Dr. A. O. Singleton, Galveston, Tex.:—I feel sure that further discussion will not add anything to the already much discussed papers. I feel gratified at the interest that has been taken in the discussion. I agree that the procedure is not simple, but it is probably the surest method of getting blood over, and blood that is in good condition. With a little practice I am sure all of you will find that it works satisfactorily.

I thank you.

FIBROIDS COMPLICATING PREGNANCY.*

By W. Kohlmann, M.D.
New Orleans, La.

If the presence of fibroid tumors of the uterus is a cause of sterility is a question not definitely decided. The fact must be recognized that certain varieties of fibroid, especially the submucous variety, will create a difficulty in regard to pregnancy.

Szametz, Freiburg, reports 15.73% primary sterility in 271 married women with fibroids in comparison with 10.3% sterility in women not suffering from fibroid tumor. The average age of these patients was forty-two years. Secondary sterility he finds in 52 cases, 28.6%. Two hundred and fifty fibroid patients had an average of 2.07% children, other women 4.4% children, showing the diminished fertility in presence of fibroid. Sterile women suffer relatively more frequently from fibroid than women who have borne a large number of children.

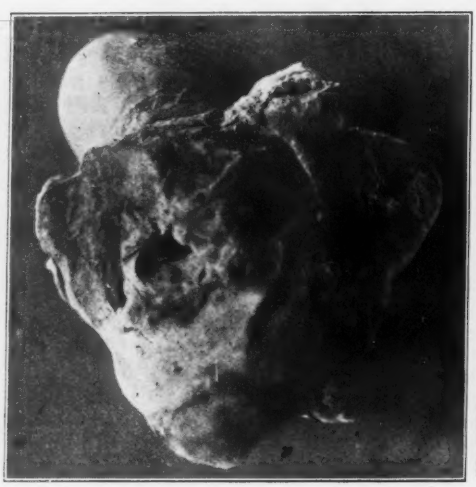
Hofmeier denies entirely the influence of fibroid on sterility. He even suggests that in certain instances in older women the presence of fibroid rather predisposes to pregnancy on account of the prolonged ovulation and menstruation produced by the existing fibroid. This opinion of Hofmeier's could only be proven by the observation of cases who, in younger years, in the absence of fibroids, were sterile, and later, after development of fibroids, conceive.

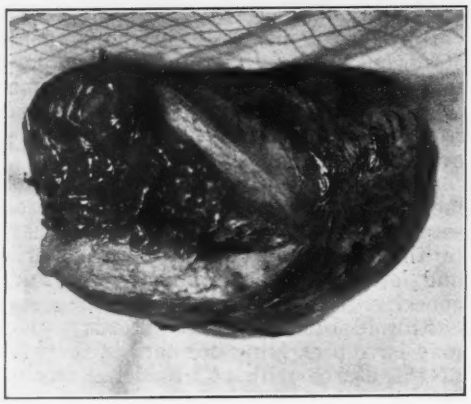
Fibroid tumors of the uterus, which may have been lying dormant in the walls of the uterus without producing any objective or subjective symptoms, or even have not been noticed, will, with the beginning of a complicating pregnancy, enlarge or degenerate, and in this way a pathological process, though absolutely benign, may be quickly changed to an extremely malignant state.

*Read in Section on Surgery, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

Olshausen states that in many cases a number of small fibroids the size of a walnut, or slightly larger, may not be recognized or may even be mistaken for small foetal parts. Such cases he considers having no influence, neither on pregnancy nor labor, and have been quite frequently observed by him. Scipiades, in a careful study of the cases in the gynaecological clinic in Budapest, comes to the following conclusion: Only the small percentage, 17.2%, remain free from all symptoms. In these cases the growths were situated in the fundus and were of the size of a fist or less.

The most frequent complaint—34.07%—was pain, and was noticed particularly in tumors of larger size and diminished mobility, especially in fibroids of the cervix and the fundus near the cervix. Almost as frequently—28.57%—symptoms due to pressure have been noticed, such as difficulty in emptying the bladder and rectum, dyspnoea, and heaviness in the abdomen.





The observation of many authors leads to the same conclusion—that this complication means not only painful symptoms, but most frequently danger to the life of the child and mother. In considering the treatment of this complication it seems advisable to differentiate the following classes of cases:

The first class, which includes probably

the majority of cases, is without any clinical importance, as pregnancy and labor are not disturbed and the whole process passes as in a normal uterus. The tumors may have been noticed in an examination during pregnancy or after delivery. In some cases of this kind increased postpartum bleeding may lead us to a closer examination.

In another class of cases fibroids are present which, during pregnancy, cause symptoms which could be dangerous for mother and fetus and demand more active interference. Under such conditions conservative treatment should be employed and the tumors enucleated.

Mrs. K. R. Age 25 years. Touro No. 47326. Admitted April 12, 1915. Discharged May 1, 1915.

Menses always regular. Was confined ten months ago; confinement was prolonged on account of presence of tumor the size of a foetal head, which was obstructing labor, but could eventually be lifted into the abdominal cavity. Patient refused operation, which was advised to prevent future complication.

Last menses three months ago. Since two months has had pain of varying intensity in left lower abdomen, especially after exercise. If pain is more severe some fever is present.

Upon abdominal examination a mass of the size of a big orange can be felt occupying the left iliac fossa, which is sensitive on touch.

Vaginal examination: Uterus enlarged—size of three months' pregnancy. On the left side of the uterus a hard, irregular mass can be felt.

Operation: Incision in median line reaching to one inch below the umbilicus. In the left side of the abdomen a tumor—subserous fibroid—is felt, which is attached to the uterus near the origin of the round ligament. The tumor shows dense adhesions to the abdominal wall, round and broad ligament. Removal of tumor after dividing adhesions.

Patient made a good recovery and was delivered September 9, 1915, of a normal female child; delivery was easy.

Mrs. E. W. Age 23 years. Touro No. 37735. Admitted May 14, 1913. Discharged May 23, 1913.

Pregnant two months. Tumor the size of an orange at fundus of uterus, right side. Suspicion of extrauterine pregnancy.

Laparotomy: Fibroid removed. Patient went through a normal delivery.

Mrs. L. P. Age 35 years. Admitted to Charity Hospital October 27, 1913. Discharged November 22, 1913.

Pregnant two months. Painful tumor the size of a fist connecting with uterus.

Laparotomy: Excision of fibroid. Abortion on fourth day.

In the third class of cases the pregnancy may, notwithstanding the complication with even large fibroids, develop without objectionable symptoms, but the location and size of the tumor, or the dislocation of the uterus, make an expectant treatment—possible normal delivery—at the end of pregnancy extremely dangerous to mother and child. Delivery per vias naturales would, in certain cases of retrouterine or retrovesical tumors, be impossible. In such cases nothing should be done during pregnancy, but at the end of the normal term, or at the beginning of labor, the adequate treatment is to be decided. The operation preferable under such condition should be Caesarian section with supravaginal (Porro's) or total hysterectomy.

Mrs. C. K. Age 35 years. Touro No. 29862. Admitted June 4, 1911. Discharged June 18, 1911.

Family History: Nothing abnormal.

Previous History: One child living, six abortions since birth of child. Menses regular; somewhat painful last day.

Present Illness: From beginning of pregnancy until recently had had fainting spells, associated with severe nausea.

Physical examination showed abdomen greatly distended, uterus irregular in shape. Bag of water had ruptured. Labor pains were irregular, though strong. Since labor had not advanced after forty-eight hours, Caesarian operation was decided upon. After opening the abdomen the uterus was found irregular on account of the presence of about six fibroids—intramural and subserous; one of the fibroids had reached the size of a fist. Porro's operation was performed. Mother made a good recovery and child lived.

Mrs. M. H. Age 33 years. Touro No. 48183. Admitted June 2, 1915. Discharged June 17, 1915.

Examination showed the uterus to be irregular in shape; cervix does not open. A Caesarian section was decided upon and, after opening the abdomen, the uterus was found to contain three fibroids. A male child was delivered weighing seven and a half pounds.

The last class comprises cases of fibroids in which the progress of pregnancy would increase the suffering and even endanger the life of the patient. On account of the unfavorable position of the uterus and the uterine channel abortion is very difficult and dangerous, and even after successful termination the patient is neither relieved of the disease nor of the danger of a repeated pregnancy. Under such conditions the hysteromyomectomy uteri gravidi totalis or supravaginal as recommended by Landau should be the operation of choice.

Such a case prompted me to select this theme for discussion and the photograph of the specimen, which I desire to show, is a good reproduction of the tumor, of which the pregnant uterus appears to be only an appendage.

Mrs. A. W. Age 29 years. Married ten months. Admitted Charity Hospital November 25, 1914. Discharged December 12, 1914.

Diagnosis: Fibroid of uterus complicated with pregnancy.

Family History: Negative for tuberculosis, cancer or hemophylia.

Present History: Denies ever having been sick. Appetite good. More or less constipated. No abnormalities in urinary organs.

Menstrual History: Menses began at about thirteen; has always been regular—thirty day type—associated with more or less pain, which at times would be so severe that she had to go to bed. Flow was quite profuse, lasting usually four days. Last menstruation was four months ago.

Present Illness: About one week before being admitted to hospital she was taken suddenly sick with pain in abdomen covering almost the entire left side; these pains were of a burning character. Pains were so severe that hypodermic medication was given by the attending physician. She was extremely nauseated and vomited several times. She does not think that she had any rise of temperature. The physician told her that she had a tumor in the abdomen and advised her to seek attention in the hospital. She had paid no attention to the tumor, thinking that the swelling was due to pregnancy. Examination of the abdomen shows the presence of an extremely sensitive tumor in the lower abdomen the size of a man's head. Tumor is hard with the exception of the left half side, which is soft and shows intermittent contractions.

Vaginal Examination: Pelvis filled with hard mass. Cervix pushed toward the front and upwards and just could be felt above the symphysis.

Operation November 25, 1914. Median incision. Panhysterectomy, right salpingo-oophorectomy. Vaginal iodoform gauze drain.

Pathological Report (Dr. Lanford):

This specimen is a large more or less oval mass measuring 27 cms. in length and 15 cms. in breadth. It is made up of the uterus, which is increased in size, and has a right tube and ovary attached. Springing from and involving the entire posterior wall of the uterus is a large firm mass covered with peritoneum. On sectioning this mass we find it presents the ordinary picture of the leiomyoma.

The uterine canal is markedly increased in length and distorted by this tumor mass. In the fundus is located a foetus of about four and a half months. The uterine wall is thickened and shows several small leiomyomata.

Diagnosis: Intramural leiomyomata complicating pregnancy.

A case showing similar, but not as violent, symptoms was under my observation two years ago.

Mrs. M. M. Age 30 years. Admitted Illinois Central Hospital July 11, 1913. Discharged July 31, 1913.

History of three months' pregnancy. Uterus somewhat irregular in shape and a large, painful mass on right side of uterus.

Laparotomy showed multiple fibroids. Supravaginal amputation was performed.

Pathological Report (Dr. Lanford):

This specimen is an irregular mass measuring 9 cms. in length and 12 cms. in breadth. It is made up largely of the uterus, which has been amputated from the cervix. Springing from the surface are a number of more or less oval firm nodules varying in size from a pea to a large hickory nut. On sectioning these nodules they offer considerable resistance to the knife. Their cut surface is of a glistening white color and is divided into a number of irregular areas by bands of connected tissue running in various directions.

On opening the uterine canal we find it filled with a foetus of about three months. The uterine wall is thickened, and here and there we find circumscribed masses of firm tissues similar in structure to the nodules projecting from the serous surface.

Diagnosis: Intramural and sub-serous leiomyomata complicating pregnancy.

DISCUSSION.

Dr. Herbert P. Cole, Mobile, Ala.—There is an interesting observation made by Troells (Monat scrift fur Geburtshulfe und Gynakologie, XXXV. No. 6, p. 671) in which he states that the normal tendency to proliferation possessed by the uterus finds its normal expression in pregnancy; when there is no pregnancy the uterus manifests this tendency in a pathological way by myoma formation. This view is sustained by various data and the fact that the myoma develops as a rule when the uterus has given up the hope of pregnancy, namely, in the forties and after fifty.

The Landau's, (Berliner klinische Wochenschrift, August 11, 31, 1445, Landau, L. & T.) calls attention to the numerous apparently normal deliveries despite the presence of myoma in the uterus.

They cite their experience of fifty-seven patients requiring operative treatment for a myoma of the uterus during pregnancy with no mortality and a mortality rate in five hundred and forty-four cases of uterine myoma without pregnancy of one and eight-tenths per cent.

It seems to me that the indication for interference in myoma during pregnancy largely depends upon the patient's history, especially the history of previous abortions. The location of the myoma is important, the subserous being least liable to the serious disturbances during pregnancy. The presence of a large myoma in the lower portion of the uterus found during the early months of pregnancy is best interfered with. Such a patient, however, under proper surroundings might go to normal delivery, or Caesarian section, if kept under careful observation.

Probably the most important association of myoma with pregnancy is its production of sterility. This occurs in three ways:

1. There is coincident with the presence of myoma hyperemia of the endometrium, which prevents normal implantation of the placenta.

2. The presence of the myoma in the uterine wall prevents the normal enlargement of the uterus.

3. The location of a myoma in the uterus may prevent expulsion of the foetus at term.

Dr. F. G. DuBose, Selma, Ala.—It has been my privilege to operate on three cases of fibroids complicating pregnancy. In one we intentionally removed a large fibroid situated in the lower anterior segment of the uterus because we believed that it would interfere with delivery at term. In the other case the pregnancy was found at operation and was overlooked from the fact that the patient had a profuse uterine hemorrhage just previous to her operation. Examination revealed a tumor about the size of the fist. This was a submucous fibroid, which we removed. The pregnancy was not interrupted, she went to term and was delivered of the living child. The other case was operated on because we believed that if the tumors were allowed to remain they would seriously interfere with delivery. That was before we were doing many Caesarean operations; certainly before the operation was as popular as it is today. Two of these cases went to term and the other aborted at the end of six months.

We had another case with the diagnosis of inversion of the uterus that was really a submucous fibroid of large size. She carried the fibroid in her uterus, went through a normal delivery, and in about ten days after she was delivered she had violent pains. This tumor mass appeared at the vulva; it was about the size of a small child's head. She was brought to the hospital, a diagnosis of submucous fibroid made and it was removed.

Many factors should influence our decision with reference to the pre-delivery removal of fibroid tumors. If the people have had many children, and if they are willing to take the risk of an abortion or a miscarriage as a result of the myomectomy, then it is permissible to do the myomectomy and not interrupt the pregnancy. I would condemn that procedure which interrupts pregnancy under these conditions with the present favorable surgical results of Caesarean section at term. I do not believe that one is ever justified in interrupting a pregnancy solely because of the presence of the tumor, however large the tumor may be. If they are near a hospital and can be reached, any of the exigencies which might arrive can be dealt with with comparative safety, and if allowed to go to term they can be delivered either by the misplacement of the fibroid on the one hand or by a Caesarian section on the other.

Dr. John H. Blackburn, Bowling Green, Ky.—I have had the opportunity of observing—not the effect of fibroids on pregnancy, but in one particular instance, presumably the effect of pregnancy on fibroids. I recall that in my vacation preceding my senior year, in the absence of my preceptor, I was left to stand guard, and, with my limited knowledge of affairs, I thought she was at term and after she delivered herself of a five months fetus there was still a nodular mass above the umbilicus, and examination showed it to be unmistakably fibroid of the uterus, presumably of the subserous variety.

Three years after that the husband of this woman came to me after I had graduated and located and made arrangements for me to attend his wife, provided the local physician had any trouble such as she had had before. This woman, some three years after the occurrence spoken of, delivered herself without any trouble whatever, and the attending physician told me afterward that if there was a fibroid at delivery he failed to discover it, which would favor the theory that they are sometimes absorbed.

Dr. Kohlmann Closes.—What I mainly wanted to bring out in my paper was the indications for interference. I do not think it fair to produce an abortion in the presence of fibroid, whether it gives trouble or not. Of course if it was so great as it was in this patient, where she could hardly go to the end, an operation would be indicated. In all other cases I would think the patient should go along and risk the fibroid to the end, and even then the patient might be delivered in the natural way; but if any difficulty is to be expected I think excision of the uterus and Caesarean section would give the most favorable result, because eventually that patient will have

to be operated on any way, even if we think a fibroid not a dangerous condition. If we confined her in the natural way we might have post-partem hemorrhage, but I have seen a number of cases that were bleeding and I did not know why, and close examination made me find a fibroid of a small size present. If there is a larger tumor, a degeneration of the tumor might take place. The tumor might slough, as I have seen cases of that kind. That is the reason that I believe such interference will be, as far as child and mother goes, preferable.

In regard to the remark of Dr. Blackburn on the disappearance of a fibroid in pregnancy, that may be possible. I remember one case when I was much surprised over the possibility of fibroids complicating pregnancy. It was many years ago. I thought the patient ought to be relieved of the tumor, which was quite large and gave a great deal of pain. I made a laparotomy, but there I ended and closed up again. She had six children afterwards, and I saw her after the fifth or sixth child, and the tumor was no larger or smaller than it was before.

ARSENOBENZOL, WITH A PRELIMINARY REPORT OF SIXTY INJECTIONS.

By Loyd Thompson, Ph.B., M.D.
Physician to the Syphilis Clinic, Government Free Bath House,
Hot Springs, Arkansas.

The administration literally of millions of doses of salvarsan and its close relatives, neosalvarsan and salvarsan natrium, leaves little to be said concerning their therapeutic worth. And on account of their proven value with the outbreak of the great European war, and the subsequent shortage of these preparations, a substitute seemed almost necessary.

It was not long before an English-made salvarsan was placed upon the market under the name of *Kharsivan*, and a French product, called *Arsenobenzol-Billon* was put out, while somewhat later a salvarsan of Canadian make was produced and marketed under the name of *Diarsenol*.

In this country after the shortage of the German product came, prices ranging as high as $100 per dose or even higher were paid for salvarsan, and of course a great many physicians were forced to discontinue its use. Quite a number substituted one of the other arsenicals, sodium cacodylate, soamin, etc., while the Intravenous Products Company of Denver reaped a harvest in the sale of their *Venarsen*. This product, which was rejected by the Council on Pharmacy and Chemistry of the American Medical Association[1], was shown to be a simple solution, containing approximately 9 grains of sodium cacodylate, 1-40 grain of mercury biniodide and 3-4 grain of sodium iodide to each full dose.

In October, 1915, Dr. J. F. Schamberg[2] communicated to the Editor of the Journal of the American Medical Association the interesting news that he and his associates of the Dermatological Research Department of the Philadelphia Polyclinic had reproduced salvarsan and had also made a number of the new arseno-benzol products.

In a paper by Schamberg, Kolmer and Raiziss[3] it was shown that the American product was the equal of the German salvarsan and was superior to German neosalvarsan in its effects on experimental trypanosomiasis, that the toxic effects on rabbits were at least no more marked than those of German salvarsan and that the therapeutic results were "indistinguishable from those obtained with the German product."

I received my first ampules of asenobenzol, as the American product is called, in January, 1916, and since that time have administered sixty doses to twenty-two patients.

The American salvarsan is a more nearly amorphous powder than the German product and is put up *in vacuo*, instead of in nitrogen as is the latter. It is somewhat less soluble in water than the German salvarsan, although it dissolves with comparative ease if boiling water is used.

The following technique for preparation and injection has been found to yield very satisfactory results. The day injections are to be made water is distilled into flasks which have been sterilized by dry heat. To one flask is added sufficient chemically pure sodium chloride to make normal salt solution (8.5 per cent.), while one or more flasks of water are collected to which no salt is added. These flasks are autoclaved with the apparatus used for preparation and injection for twenty minutes at twenty pounds pressure.

In preparing the arsenobenzol the ampules are immersed in a jar of alcohol to determine that they are not cracked, as well as to sterilize the outside, allowed to

dry in the air, filed with a sterile file and broken. The contents are emptied into the mortar and the boiling, autoclaved water poured into it in the proportion of 20 c.c. to each 0.4 gram. One, two, three or four doses may be prepared at once. By vigorous trituration with the pestle the arsenobenzol goes into solution in two or three minutes. It is important that it be completely dissolved. The yellow solution, which is strongly acid, is now poured into a glass graduate and 15 per cent. sodium hydroxide is added until a heavy precipitate forms, which partially dissolves upon the addition of more of the sodium hydroxide. When the solution is but slightly cloudy *normal* (4 per cent.) sodium hydroxide is added drop by drop, followed by vigorous stirring with a glass rod, until it is perfectly clear. By the use of normal sodium hydroxide the danger of getting the mixture too alkaline is reduced to a minimum. As a rule 12 drops of the 15 per cent. and 3 or 4 drops of the normal sodium hydroxide are required for complete neutralization of 0.4 gram.

Following this the total quantity is made up to 10 c.c. for each 0.1 gram of arsenobenzol. Thus, three ampules of 0.4 gram each are made up to 120 c.c. It is then filtered through a sterile filter paper into one of the burettes used for administration.

The injections are made with an apparatus consisting of a two 250 c.c. burettes connected with a three-way cock so arranged that blood for Wassermann may be collected at the time of injection. The entire apparatus is rinsed out with the autoclaved salt solution and the burette which is not used for the arsenobenzol is filled with this to be injected both before and after the injection of the drug.

By the use of this apparatus and making the drug up in the dilution stated four doses of 0.4 gram. may be prepared and administered in twenty to thirty minutes.

For reasons which have been described elsewhere[4] I have discarded Ricord's stages and consider syphilis from a purely pathological point of view. Thus in the so-called secondary stage, I refer to the type of lesion present, macular syphiloderm, papular syphiloderm, etc.

In the present series there were two patients suffering with chancre alone, or with chancre and adenopathy; four patients with syphilodermata, two with syphilis of the liver, one of them with marked jaundice, eight with syphilis of the nervous system, six with no symptoms but a positive Wassermann (so-called latent syphilis) and one patient without syphilis. This latter patient had vague symptoms of syphilis of the central nervous system, a negative history and a negative Wassermann upon the blood. As he refused a lumbar puncture and insisted upon the administration of anti-luetic treatment three injections of arsenobenzol were given, with absolutely no improvement.

The patients are prepared for injection by instructing them to eat a light meal the previous evening, to take a purgative and to eat no breakfast the morning of injection. The condition of the kidneys is determined by a urinalysis as well as a phenosulphonephthalein test.

The average dose is 0.4 gram although in small individuals the dose is smaller.

In this series reactions following injections were rare. One patient with syphilis of thirty years standing, with no evidence of the disease but a strongly positive Wassermann but who was also suffering with a slight nephritis had a very hard chill and a rise of temperature to 103° F. following the injection of 0.2 gram. The urine was also much worse the next day, showing an increased amount of albumin and a greater number of casts.

One other patient with a chancre of the urethra of two weeks' standing with a strongly positive Wassermann but no eruption, had a slight chill and a rise of temperature of 101° F. In no other cases were chills or fever recorded. Several patients complained of more or less headache following injection while four patients were nauseated and one vomited.

In regard to the therapeutic effects I will say that absolutely definite conclusions cannot be drawn as all patients received mercury in some form, usually the benzoate, either intramuscularly or intravenously, as well as the arsenobenzol. However, the effects certainly were as good as those obtained with salvarsan of German make.

One patient with syphilis of two years' standing with no symptoms but a strongly positive Wasserman received six injections of 0.4 gram arsenobenzol and 4.2 grams (63 grains) of benzoate of mercury intra-

muscularly in six weeks' time. The positive Wasermann changed to a negative after the fourth injection of arsenobenzol and six weks after the last injection was still negative.

The lesions of one patient with a very marked nummular papular syphiloderm of four months' standing began to clear up in a remarkable manner following the second injection of 0.4 gram of arsenobenzol in connection with benzoate of mercury. This patient is still under treatment.

One patient, a physician, with syphilis of the liver, in which that organ was markedly enlarged, and whose blood showed a strongly positive Wassermann received three injections of 0.4 gram and intramuscular and intravenous injections of benzoate of mercury. Following the third injection of arsenobenzol the liver was found to have markedly decreased in size, and the patient said he felt better than he had in years. The Wassermann reaction, however, still remained strongly positive. At this time the patient was forced to leave for his home but will return in a couple of months for further treatment.

All of the other cases with the exception of the non-syphilitic mentioned above showed either clinical or serological improvement and will be reported in detail in a later communication.

REFERENCES.

1. Jour. Am. Med. Assn., 1915, LXIV, p. 1780.
2. Ibid., 1915, LXV, p. 1387.
3. Schamberg, Kolmer and Raiziss; Ibid, p. 2142.
4. Thompson: Syphilis, Lea and Febiger, New York and Philadelphia, in press.

Dugan-Stuart Building.

AUTHOR'S ABSTRACTS

Surgery, Gynecology, Obstetrics and Genito-Urinary Diseases.

The Celluloid Tube in Finger Injuries—Its Use in Adding Length to the Terminal Phalanx After Traumatic Loss of Tissue. By John Staige Davis, Baltimore, Md. Journal of the American Medical Association, May 15, 1915, pp. 1647-1649.

The technic is as follows: The stump is painted with tincture of iodine. The shaped piece of celluloid, after being soaked in mercuric chlorid, 1:1,000, for a sufficient time, is sponged off with ether or alcohol. It is then wrapped around the finger and secured with narrow adhesive strips, thus making a tube which is slightly smaller at its free end than at its base. It will hug closely the edge of the wound, and will gradually become larger until it impinges on the first interphalangeal joint. The celluloid may extend as far beyond the finger tip as is needful. It also serves as a splint for the finger and as a protection to the wound.

In cases seen early, a blood clot is allowed to form in the tube, serving as a scaffold for granulations. If the soft parts are lacerated and spread apart they are gathered together and held in place by the tube.

After the granulations have started, every effort is made to stimulate their growth, and to train this growth along the tube.

Medication may be applied after the celluloid is in place, either by pouring it into the tube or by packing the tube with gauze. The dressing in this way comes in contact with the wound, and is confined by the tube. A loose gauze plug is then placed in the mouth of the tube, and over all is a small dressing.

The results have been better than with any other method with which I am familiar.

AUTHOR'S ABSTRACTS

Medicine.

(Continued from page 406)

it frequently reaches the rectum by the urethrovaginal secretion passing downwards over the perineum. In infants and young children rectal invasion practically always occurs through mediate contact.

Less than 200 cases of Neisserian proctorrhea have been reported, several of which are reviewed by the author. The pathology and treatment differ in no essential respect from Neisserian disease implicating other anatomical situations.

Conclusions: (1) The rectal mucosa is not immune to invasion by the Neisserian diplococci.

(2) In adults the infection is oftentimes acquired by pederasty. In children it is always due to mediate contact.

(3) That when inadequately treated it is apt to become chronic and may be followed by ulceration, stenosis and other serious sequelae.

(4) That to be effective treatment must be promptly instituted and prosecuted with equal thoroughness and persistence as that applicable to Neisserian disease in other situations.

Treatment of Nocturnal Enuresis. By M. Mendeloff, Charleston, W. Va. West Virginia Medical Journal, February, 1916, p. 258.

Nocturnal enuresis is a frequent disorder of childhood caused by a weakness of the sphincter of the bladder and by an absence of co-ordination of the parts of the sympathetic nervous system which governs micturition. A number of other disorders, as acid urine, phimosis, adherent clitoris epilepsy, intestinal parasites, anal fissure, may cause it. But when all these causes have been eliminated there remains the majority of the cases in which no pathological lesion can be found; these are the cases which defy our therapeutic skill, and are not amenable to any form of treatment, medical or surgical.

For a time a belief was current that hyper-

(Concluded on page 463)

EYE, EAR, NOSE AND THROAT

A STUDY OF FIVE HUNDRED TONSIL ENUCLEATIONS WITH THE BECK-PIERCE TONSILLECTOME.*

BY HOMER DUPUY, M.D.
New Orleans, La.

While some may doubt that Joseph Beck's contribution in the form of a modified Pierce tonsil snare, and a variation of the Sluder technic, will prove the last word in the enucleation of the faucial tonsil, nevertheless the instrument and the method we think mark an advance.

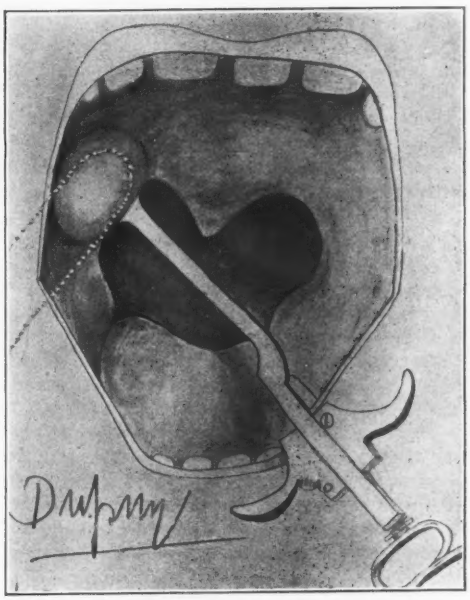
The purpose of this paper is to furnish data based on a study of five hundred consecutive tonsillectomies in which this particular instrument and method were applied. In tonsillectomies such questions as hemorrhage, reaction, anatomical results and the influence of the method of enucleation on these are of paramount importance.

It is proposed in this report to briefly consider such items in the following subdivisions:

TECHNIC.

To Sluder belongs the credit of having first demonstrated that the sinus tonsillaris is quite movable, and that the tonsil can be dislodged from its bed. We found that whenever we could Sluderize a tonsil—when we could push it through the ring of the tonsillectome — enucleation was well-nigh certain. With this as a criterion we found that in over 85% of our cases it was possible to successfully use the Beck-Pierce tonsillectome.

In the main we adopted the technic of first lifting the tonsil upward into the supratonsillar region, then gently pushed the tonsil through the ring. Keeping the index finger on the everted tonsil, the wire loop, which further separates the tonsil from its attachments, was slowly drawn. At this stage the whole cryptic surface of the tonsil protruded through the ring of the instrument. A tenaculum or grasping forceps secured this mass. During the whole time, from the pushing of a tonsil through the ring to its removal from the throat, the index finger, which acts as a fulcrum, was not moved from its position over the outside of the ring. The tonsil was gradually squeezed out of its bed and only a thin layer of the capsule adhered to the tonsil. The greater part of the capsule remaining behind as a complete protective lining of the fossa.



First step. Tonsil being pushed through the ring of the Tonsillectome.

We frequently modified this procedure by using, as practiced by Sluder, the hump on the lower jaw (the alveolar eminence) as a fulcrum. The tonsil was first pushed through the ring and then drawn downward over the hump of the jaw. The index finger was then withdrawn and the alveolar eminence made to serve as a fulcrum, against which the base of the everted tonsil was firmly held while the snare in the tonsillectome completed the enucleation.

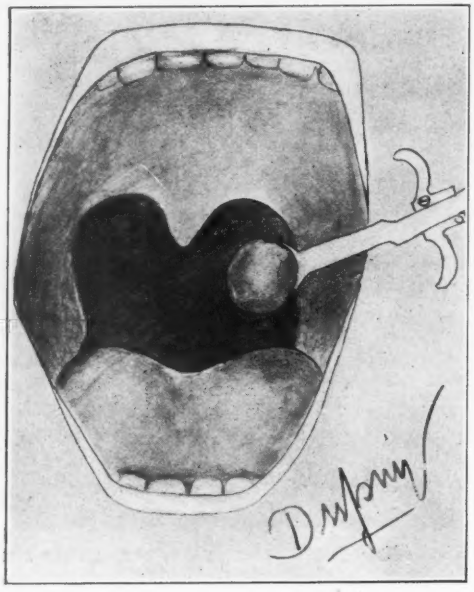
*Read in Eye, Ear, Nose and Throat Section, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, November 8-11, 1915.

We found this modification of the Sluder technic especially adaptable to low-hanging tonsils, in which case the inferior pole is grasped and when engaged in the ring is better secured, for it is pushed up against such an immovable point as the hump of the lower jaw.

HEMORRHAGE.

The hemorrhage was notably less than by any other method. In some instances the hemorrhage was quite brisk. A spurter in the field of operation, a venous plexus and other anatomical variations in the regional blood supply readily accounted for the undue bleeding. There was only one case of severe post-operative hemorrhage.

Susie B., w. f., age 6. Bled so profusely six hours after the operation that



Second step. The Everted Tonsil protruding through the ring of the Tonsillectome.

a ligature was applied to the bleeding vessel in the left fossa. This controlled it.

It was noticed that the bleeding was greatly lessened when the wire loop slowly and gradually severed the tonsil from its surroundings. We believe that at least one minute should be covered in tightening the wire around the tonsil.

As it is our invariable practice to control at the time of the operation all undue bleeding by suture ligation, we find that the introduction of the Beck-Pierce instrument in our tonsil work has resulted in the application of fewer ligations.

This is just what should be expected from a procedure which, as already stated, usually leaves intact the aponeurotic covering of the tonsillar fossa. The exposure of muscle tissue being greatly minimized, less bleeding ensued.

REACTION.

In the great majority of our cases the local reaction was remarkably less than by any other method hitherto practiced, with the possible exception of the Sluder. It was this very feature which first attracted our attention. A technically perfect removal of the tonsil with this particular instrument leaves a smooth fossa. There is no destruction of such anatomical structures as muscles, or mucous membrane covering of the pillars. Enough of the intrapharyngeal aponeurosis remains to protect the muscle tissue which forms the greater part of the lining wall of the sinus tonsillaris. This lessens the possibility of local infection by leaving a practically intact fibrous covering for the parts. Dysphagia and general discomfort were markedly lessened. The high temperature and the severe sepsis, which but too frequently follows the dissecting methods, were, without exception, absent in our series of cases.

Experimentally, in a number of cases, we dissected out one side and on the other side applied the Beck. The result usually followed that the dissected side showed a great deal more reaction.

AGE.

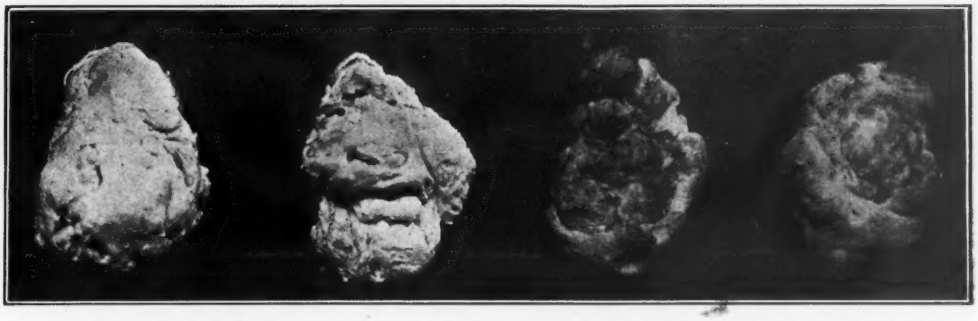
The majority of subjects—nearly 400—were under ten years of age. About 250 of this group ranged between 4 and 6 years. About 100 were between 11 and 15 years. There were only six adults operated by this method. Age unquestionably played a part in our successes and failures. The greater number of failures occurred after the tenth year. This is explained by the preponderance of submerged—flattened—tonsils with inflammatory adhesions, and low-hanging tonsils projecting below the level of the tongue

which are usually present after the first decade.

These types of tonsils offered mechanical difficulties, but those which at first appeared insuperable were finally mastered with extended experience and a perfected technic.

The small — lymphoid — tonsil usually found in very young subjects proved difficult of removal until the smaller ring tonsillectome of Beck was put into requisition. We deem this an important observation, for success or failure must attend the selection of a small or a large ring tonsillectome.

Our experience with adults, operated under local anesthesia, proved disappointing. There was great pain and two failures to enucleate. Moreover, the strain put on the wire loop frequently snapped it.



Anterior and Posterior Surfaces of Tonsils removed with the Beck-Pierce Tonsillectome.

ANATOMICAL RESULTS.

The advantages of this operation promised fewer local deformities. The less traumatism in and around the fossa the less post-operative inflammation, and this in turn means a reduction in the final cicatricial contractions. This theoretical consideration was amply verified, for by this method of enucleation there was such slight damage to the surrounding parts that the formation of scar tissue, with its consequent pharyngeal and palatal deformities, proved most infrequent. The normal architecture of this region was perfectly preserved. There were, therefore, no such regretable functional results as unpleasant voice changes, or paresis of the soft palate with the passage of fluids through the nose. The legacy of distorted pillars and absent uvulas, too frequently seen after the various dissecting methods, were not in evidence in a single case.

Improvement in operative technic further reduced to a negligible quantity those ugly sequelae which reflect the greatest discredit on surgery of the tonsils.

CONCLUSIONS.

Among the advantages claimed for this operation—the Sluder modification with the Beck-Pierce tonsillectome—are: enucleation is quickly performed, the instruments are simple and easily handled. And, most important, if the wire loop is drawn through slowly, bleeding is markedly reduced.

The ideal method for enucleation of the tonsils should leave some of the so-called capsule behind as a complete lining for the fossa. The technic and instrument we have considered, while removing the whole tonsil without adherent tags of muscle tissue, seems to fulfill this condition.

Less traumatism means less reaction; less reaction, greatly reduced post-operative cicatricial contractions and deformities. We find that the Beck produces a minimum amount of traumatism and for that reason, in our hands, has proven eminently satisfactory.

This method recommends itself particularly for young children, before the tonsil has developed pathologic adhesions. But even under these conditions improved technic will successfully remove many adherent and submerged tonsils.

Finally, the assistance of my co-workers in the Charity Hospital Service, Drs. De-

Poorter, Weiss, Boebinger and Keitz, who made possible this contribution, is gratefully acknowledged.

Discussion of this paper follows next paper.

TONSILLECTOMY ACCORDING TO THE SLUDER TECHNIQUE.*

BY P. M. FARRINGTON, M.D.
Memphis, Tenn.

Because of the fact that so much bad work is done on tonsils, even in this day, I feel thoroughly justified in presenting another paper on the subject.

Many years since I was taught to slice off the top of tonsils and call it an operation. I was also taught to curette and cauterize the diseased crypts and to break up adhesions between the gland and the pillows. All these things I have done repeatedly. In those days we were not acquainted with the many pathological conditions which had their origin in diseased tonsils. Today we are impressed with their importance. From a very imperfect knowledge of their function, coupled with very faulty technique in the surgery of them, we have come to hold rather definite ideas regarding both the tonsil and its surgery. While this paper is not concerned with aught save the surgical end of the subject, I beg to state in passing that my experience and observation, coupled with that of the majority of the present-day operators and writers, have led me to several definite conclusions.

1. I avoid the removal of tonsils before the fifth year, if possible.

2. I remove tonsils because of their size, if they are interfering with free, normal respiration, it matters not what the age.

3. I remove tonsils, be they ever so small, if they are diseased and have been the seat of repeated inflammations, and I especially urge it if there has been any gland involvement.

4. I attempt to remove the entire gland in its capsule, for the reason that remnants of capsule with tonsil attached can astonish you by their growth in the course of a very few months.

5. I only operate in hospitals, because of the danger of hemorrhage and infection.

6. Since the pathology of the tonsils has reached such a zenith and its complete removal has become so important, I wish thoroughly to condemn the practice of general men or pediatricians or general surgeons, improperly trained and lacking the proper technique and interest in this operation, undertaking it. With us it is of first importance; with them it is a side line, so to speak, and they devote precious little time or thought to its proper performance. I speak advisedly, for I have seen much bad work at their hands. As a result of bungling many, many cases come to second operation, which causes much doubt in the minds of the laity as to the benefit to be derived from tonsil operations.

A few years since I became impressed with the fact that I was not getting the results from my tonsil operations that I had reason to expect. I was unwilling to subject my patients to any procedure that would endanger their lives and I, therefore, cast about for some method that would be thorough and at the same time safe. I had heard the Sluder instrument complimented as being an instrument that would remove the entire tonsil in its capsule. On the other hand, I had heard of the tendency to bleed following its use. Considering the matter to be of importance, I made it convenient to visit St. Louis and see the instrument demonstrated. I was highly pleased with its work and proceeded immediately to acquire the proper technique under the direction of a competent instructor.

Dr. Sluder has shown us very carefully how the instrument is to be used and most text-books carry a splendid lot of cuts and good descriptions of the instrument and method. For the convenience of those who have not tried this method, I have had prepared three or four cuts, from Ballinger's book, which I will ask to show on the screen and which will require but a few minutes to present.

Dr. Sluder thus describes the procedure:

"I wish to describe a method of tonsillectomy which, so far as I can learn, has not heretofore been described or used. The essential and distinctive feature of this method is the fact that it

*Read in Eye, Ear, Nose and Throat Section, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

moves the tonsil completely out of its normal bed in the forward and upward direction and then utilizes one of the anatomic markings of the lower jaw as a vantage point in putting it through the aperture of the guillotine. This anatomic marking is the well defined eminence just above the mylohyoid line, produced by the last formed molar tooth in its socket, which is rendered even more prominent in the mouth by the tissues of the gums. In childhood the posterior, unformed molar, as it lies imbedded in the alveolus helps to make the eminence. This marking has not been given a name in any of the treatises on anatomy. I have taken the liberty of naming it (the aveolar eminence of the mandible) in order to facilitate the description of this procedure.

"The instrument used is a modification of what I have always heard called the Mackenzie guillotine. Sir Morell Mackenzie, however, relates that the instrument which bears his name is a modification of one described by Dr. Physick, of Philadelphia, in 1827. The guillotine which I use is a modification of this instrument, which consists of a shaft of metal, with a circular aperture at its distal end, through which the tonsil was inserted and cut through by a blade pushed across the aperture. I have altered the original model in order to accomplish two definite objects—to get greater strength in the instrument and to increase the leverage employed in its use. These are attained (1) by doubling the thickness of the shaft, and (2) by shortening its length and making the handle longer. I greatly prefer an elliptical aperture. The usual model of Dr. Physick's guillotine at present to be found in the instrument shops is the Makenzie modification, which has a round aperture. In a few shops in the United States it has been made with an elliptical aperture, the long axis of which is transverse to that of the shaft. In this operation a correct instrument is of very great importance."

Dr. Ballinger briefly describes the technique in his book as follows:

"A—In the removal of the right tonsil, the Sluder guillotine is grasped by its handle with the operator's right hand and introduced through the left angle of the mouth until the distal portion of the fenestral margin is in contact with the interior and posterior portions of the tonsil.

"B—The instrument is then pressed firmly against the tissues, which are drawn forward and upward for a distance of about one inch. The tonsil then rests over the eminentia alveoli, which pushes the tonsil through the fenestral of the guildotine, though it may not push it all through the opening. If the blade of the instrument were forced home at this stage of the procedure, the tonsil would not in all probability be removed in its entirety, with its capsule intact. To obviate this mishap, the tonsil is drawn a little farther forward until the distal margin of the fenestral rests almost upon the apex of the eminence. The handle of the instrument is then slightly depressed to bring the interior portion of the margin of the fenestral in firm contact with the interior portion of the tonsil. This leaves the tonsil exposed to view. The left index finger is then used to push the tonsil through the fenestral. The dull blade of the guillotine should, however, be pressed gently against the anterior portion of the tonsil to hold it in position while the balance is being pushed through the fenestral with the tip of the index finger.

"C—In the third step of the operation the remainder of the tonsil is pushed through the fenestral by gently stroking it with the tip of the left index finger. As the tonsil continues to pass through the fenestral, the blade of the instrument is advanced by gentle pressure with the thumb of the right hand. The tonsil tissue is readily detected by the sense of touch, as it is firm and nodular, whereas the mucous membrane is soft, thin and smooth in texture. When the tonsil is completely through the fenestral of the instrument, only the smooth, thin mucous membrane of the anterior and posterior pillars lie between the tip of the finger and the distal margin of the fenestral. The blade is at this time advanced until only the two mucous membranes lie between its cutting edge and the distal margin of the fenestral.

"D—The blade is then forced home with considerable power, both hands often being required for this purpose, if the blade is dull."

The technique for the left tonsil is the same. The left hand being used to hold the instrument when the left tonsil is being operated, etc.

There are many small points about an operation, however, which must be worked out, according to the different tastes of the operator, and he must become proficient in their doing, else he can not hope for uniformly good results.

I have undertaken, therefore, to use the same technique in each case and I feel fully repaid for the effort. Briefly, the method I have adopted is as follows:

The same trained assistant in every case, a man who is experienced in anesthetics, urinalysis, heart, lungs, etc. I rely on him to tell me—after careful examination — whether the case is a safe operative risk. If so, the patient is instructed regarding gentle purge, empty stomach, etc. I operate in the morning that I may be easily communicated with during the day should occasion arise. Ether is the anesthetic of choice and it is given by the drop method until the patient is fully relaxed, when a Whitehead mouth gag, with an ether tube and a guard for the lips attached is placed in position. The nostrils are plugged with cotton to compel mouth breathing. The gag is connected with ether bottle by rubber tubing. This bottle is placed in a pan of warm water. An ordinary Paquelin cautery bulb is used to force the air

through the warmed ether. This arrangement furnishes a steady flow of warm ether vapor and keeps the patient thoroughly relaxed during the operation. The flow of vapor should be gentle at first to avoid undue irritation and coughing, and can be increased as your patient enters the surgical stage of anesthesia. The patient lies on his back with mouth open, but not too widely because of interference with breathing. A good light is of the utmost importance and its choice may depend upon the operator's individual tastes. The light should be so situated that with change of position of the patient the light may still be directed to all parts of the operative field.

The Sluder instrument is now placed in position as directed by the author and the tonsil removed. Immediately the space is plugged by a large gauze pad and the patient turned on the side to allow the blood to drain out. While a nurse is holding the plug in position I inspect the tonsil to see that the entire gland in its capsule is intact. If the inspection shows the capsule intact, I next depress the tongue, remove the gauze and inspect the fossae. If there are bleeding points, whether venous or arterial, I clamp them with strong forceps and leave them on for about one minute. Following their removal I dry the cavity gently with small gauze pledgets and inspect again. If I have used the clamps properly the space is dry and I proceed with the second tonsil in the same manner.

Using the clamps in this manner, I find it necessary to apply them in about one-third of the cases. It is a simple procedure and requires very little time. With proficient clamping the loss of blood accompanying complete tonsillectomy is often inconceivably small. And just here I beg to state that my time is not yet so valuable that I begrudge the few minutes given to this step of the operation, which adds so much, I am sure, to the safety of the patient. To me, the only part of the procedure which need give us concern is the matter of hemorrhage, and I have always considered that a death from hemorrhage following this operation is, with but few exceptions, uncalled for and entirely unnecessary. It is to be deplored that so much has been written and said regarding the time required to do a tonsil operation and the attempts made to break the time record by some of our leading men. They little realize the number of poorly executed operations which must follow such haste when done by the great majority of surgeons who try to equal their speed. Since January 1st of this year my records show 175 cases operated by this method. In this series the instrument alone and unaided failed in five cases, all of whom were adults.

In these five adult cases above referred to I was unable to bring the glands forward sufficiently to get them between the instrument and finger that I might crowd the tonsil through the ring. I adopted the plan of loosing the tonsil rather freely with scissors, when I was then able to draw it through the ring with grasping forceps and complete the separation by forcing the blade home.

Since meeting with these failures, I have learned by experience that the larger instrument will get most of these tonsils where the small instrument fails. When one remembers that the distal end of the instrument must rest firmly behind the alveolar eminence, you will see that in these difficult cases, where the tonsil presents a hard and unyielding surface, the breadth of the instrument must equal the length of the tonsil, so that, as the instrument is brought forward it will not glide over the gland, but will allow the proper mechanical forces to be executed so as to obtain the correct coaptation of the instrument and tonsil.

In several cases where I failed to get the entire gland at the first attempt, I was able to replace the instrument and shell out the remaining portion at the second trial. (See specimen.)

In two intractable patients, one a nervous woman and the other a spoiled child, I was forced to etherize ten hours after operation to turn out a leaking clot and clamp a small vessel. Because of the loss of blood in the child I considered it best to use horse serum (10cc) intravenously. Following this we were not troubled with further bleeding, but on the fifth day the child developed a very beautiful serum rash. The rash was very uncomfortable, but disappeared in forty-eight hours. On the twelfth day an oedema like an angioneurotic edema made its appearance and lasted for twenty-four hours. After this the child progressed normally and is now in the best of health.

One case, a girl of ten years of age, was operated on in the morning and left the table with

dry throat. Six hours following, my associate saw her and turned out a large hanging clot from beneath which there was considerable oozing. A compress held in position for twenty minutes controlled the bleeding for a time. Later in the evening I was called and found the tonsil space filled again with a large clot. The wound was still oozing. I turned out the clot and applied the pressure for thirty minutes, but the hemorrhage was not controlled. I then administered 10cc horse serum intravenously, when the bleeding promptly stopped and did not recur.

After an experience with many methods I have come to regard the Sluder operation, when properly performed, as the simplest, safest and best procedure I have yet known. To those of you who are dissatisfied with your present results, I urge upon you a thorough and fair trial of it. Using but the one instrument, you can readily see the great importance of a thorough understanding of the various steps in this method. Therefore, it is my advice that you do as I have done and obtain personal instruction from one versed in its technique.

DISCUSSION.

Papers of Drs. Dupuy and Farrington.

Dr. J. O. McReynolds, Dallas, Texas.—I feel that the tonsil work has certainly undergone more important development in the last four years than it has undergone in the previous century, and I think the papers presented by the two essayists have emphasized the most important part. I wish to say that I feel that there are many good ways to remove tonsils, and I think for a certain class of people the method presented by Dr. Dupuy is certainly almost ideal. He stated, however, that it is not applicable to the majority of the cases in adults. That is my opinion of it. And, unfortunately, the greatest responsibility rests upon us in the handling of these cases in adults where they are having systemic manifestations that must be controlled. I also feel that the method of Sluder, as described so well by Dr. Farrington, is open to some extent to the same objection, and that it is difficult for the blade of the instrument to pass along the line of cleavage afforded by the capsule. Some two or three years ago I saw the Sluder method used, and the instruments—to my notion—were correct in size, but they were all dull instruments. I brought them home and used them to my entire satisfaction, but I think that the sharp cutting instrument would be much more efficient. Since that time I have been using a sharp instrument exclusively. Now, regarding those instruments that were presented here just a moment ago by Dr. Farrington, you will observe that these instruments are perfectly sharp.

I grant you that there are a number of methods that are perfectly satisfactory for nearly all cases in children, because they have not been the subjects of attacks of tonsillar abscesses, and because they are sufficiently large to enable you to get a good grip on the tonsil. If I can ask some one to replace the chart presented by Dr. Dupuy I can show you just in a moment that difficulty which is evidenced in the very case in which we wish most to succeed. Here we have the instrument insinuated between the tonsil and the posterior pillar. Now, then, the tonsil has been passed through the opening, and if that tonsil is a child's tonsil, there will not be the slightest difficulty in holding it in the position you want while you tighten your wire, and you have a perfect result; but suppose you have a tonsil that has been operated one time or more and still is the seat of recurring attacks of inflammation, and is about one and a half inches in length and about one-eighth of an inch in thickness; then when you attempt to draw your wire on such a tonsil, the wire yields immediately after it leaves its groove and you have all experienced this trouble if you have tried the Beck instrument in a large number of cases.

There are so many things that I should like to discuss, but I want to make this one point, because that is the crucial one. As soon as your wire has left its bed in the case of a broad, long, flat tonsil with a thick capsule, your wire yields, and it slips off and fails to completely include the gland. Is not that the experience of most of you? The right thing to do, then, is to have an instruments that is sufficiently rigid to enable you to have adequate pressure at all times at the desired places. Now, then, then, with this instrument (indicating) insinuated between the posterior pillar and the tonsil, and guiding it at all times with your thumb, you can gradually close up on the gland and at all times keep your tonsil through the opening until it is completely severed, and I will say in this connection that instead of using the finger as required by Sluder, I never put my finger ordinarily in the throat at all. I use my thumb, for this reason: my thumb does not obstruct my view at all. I exert more effectual pressure and I can use the necessary force in keeping the tonsil always through the opening. There is no comparison in the amount of force which you can exert with your thumb as compared with the index finger, and then your hand is out of the way.

Now, then, I use a sharp instrument because experience has demonstrated to my entire satisfaction that such an instrument can be passed along the line of cleavage without difficulty and does not necessitate the introduction of a blunt instrument to break away the tissues that have not been severed. Now, I feel this way about it. Every tonsil, of whatever character and in all patients, can be radically removed by this procedure. I do not mean that I always succeed, but when I fail I feel that the fault is not in the procedure, but in the way in which I apply the procedure; exactly as if I go into a shooting gallery with a good gun and hit the mark ninety-nine times I do not consider that my failure the other time is due to the gun, but rather to the method of my using the gun; in other words, you may not pull the trigger just exactly at the right time; you may not use just exactly the right amount of pressure, because, after all, the success of the procedure depends upon determining the amount

of pressure which must be exerted at all times until you have completed your section. Now, the question of hemorrhage is one which, to my mind, has not been settled. I have seen serious hemorrhages from all the various methods that have been employed for tonsillectomy, and I hope the time will come when that complication will entirely disappear, but I do not feel that we have had more cases of serious hemorrhage according to this method than with some of the others. I want to emphasize one point with reference to the Ballinger modification. This instrument, you observe, is perfectly sharp, just like this one which was selected for me by Sluder. It is objectionable in this respect, that when you attempt to pass your instrument far around and crowd the tonsil forward, getting behind the tonsil, your hand, with this instrument, gets in your way, and you are unable to bring the tonsil forward with the same degree of comfort and satisfaction as with this instrument (Sluder's) (indicating). The only advantage of this (Ballinger's) would be that perhaps you might be able to exercise more force, but force is a question which comes under consideration only in the event that you are using a very dull instrument, and Sluder, as you are aware, uses not only his tremendous power, but the dog in addition, to force the instrument through the tissues.

Now, with reference to children, I find that the majority of them are rather better satisfied with a general anesthetic, and for that purpose I use nitrous oxid and oxygen to begin with, followed up by ether. Ether is used, not for the purpose of prolonging the operation so it can be complete—because the whole operation can be completed within a few seconds, about five seconds to each tonsil—but it is simply desirable so that you may be able to wash up the patient and present him to his parents in rather a more aceptable condition. With reference to adults, I find that it is distinctly preferable to operate under local anesthesia, applying over the surface cocaine and then injecting around the tonsil a small amount of adrenalin chloride and novocain. This injection around the tonsil will enormously diminish the hemorrhage to a degree that would not be possible under a general anesthetic.

Dr. H. B. Decherd, Dallas, Texas.—I would like to ask Dr. Farrington if he uses this method on adults to a great extent.

Dr. Farrington—Yes, I use it in all cases unless there are some contra-indications before the anesthetic is given.

Dr. Decherd—There is no doubt in my mind, when the operation has been properly performed by either the Beck-Mueller or the Sluder instrument (dull blade), that the resulting wound is very pretty and the pillars usually uninjured. In other words, the aspect of things is often more beautiful than in the average snare operation. I say "the average snare operation;" but if the snare operation is properly performed, the result is just as beautiful. Indeed, to my mind, an adequately applied snare does the best of all tonsil work. The hemorrhage is a great deal more in the Sluder operations that I have seen and the few that I have done in the snare operation. I have just returned from the North and East; and I have made a careful study of tonsillectomy, since I am very much interested in it. I have made a special investigation in attempting to prevent deformities after the tonsils have been completely extirpated. In past years, when I have removed the entire capsule of the tonsils, I could have dissected it off with a knife. In other words, I removed the most of the tissue immediately surrounding the tonsils, and this allows a maximum retraction of the muscles, with a consequent faucial deformity. At present, I believe that the laryngologist should make an attempt to leave this fibrous tissue in the throat, as it is a part of the pharyngeal aponeurosis covering the muscular fossa. As a refinement of technique, I perform the dissection tonsillectomy, and endeavor to leave both the plica and all other mucous membranes which can possibly be left in the throat. By so doing, I think it may be possible to somewhat prevent the raw surfaces of the resultant fossa, and if this is done the deformity will certainly be a minimum. Dr. Fletcher, of Chicago, does the best tonsillar dissection which I have recently seen. I can truthfully say that in my recent tonsillectomies, where the operation has been performed as herein indicated, there is much less traumatism and the patient complains of such little pain that he can eat comfortably the day following the operation. In the five cases that Dr. Farrington was unable to remove by the Sluder method, I feel sure that the snare would have been a perfect success. Both Drs. Beck and Sluder deserve much credit for putting tonsillectomy on a better basis. The recent work of G. Hudson Makuen along the line of intercapsular tonsillectomy should receive much praise. All other good methods serve a useful purpose, but the snare is the best instrument which has ever been or ever will be invented. It reminds me of the old adage, "Sluders may come and Sluders may go, but the snare goes on forever."

Dr. R. C. Lynch, New Orleans, La.—It has been my pleasure to see Dr. Makuen demonstrate his modification of the Beck operation, and I have done about fifty cases of this type so far. I look upon the procedure as a decided refinement of the Beck operation and as I practice the method it comes nearer my ideal of perfection than any modification advanced up to this time.

The method is that of Dr. Beck as described by Dr. Dupuy with this addition: When the tonsil has been evaginated through the loop of the Beck snare and the wire pulled down close so as to engage the capsule, a second wire loop from any snare is placed over the evaginated tonsil to the uvula side in such manner as to follow closely the loop of the Beck wire. The snare loop is then pulled down closely and finally made to cut through the capsule of the tonsil as Makuen expresses it, to split the capsule, leaving a portion in the fossa, the remainder attached to the tonsil securing perfectly complete removal of the tonsil and leaving in the fossa a capsular bed.

The advantages are few instruments, no bleeding, and this is as near bloodless as anything could be. My average for the fifty cases would not be ten drops for both tonsils. I have done any number without having to use one sponge in the fossa. The healing is very rapid; usually in seven days the cavities are clearly healed and the patient discharged.

The after pain is very much less, and in children many have never realized that the operation has been performed.

Lastly, the contractions that follow are none and the pillars are perfect in their function, leaving an ideal post-operative throat that will stand the severest criticism.

Dr. Robt. E. Moss, San Antonio, Texas.—I would suggest that in all cases where we can reasonably control them, we operate by the use of local anesthesia. I use exclusively the novacain and adrenalin. Apply locally to surface around tonsil a 10% solution of cocain; then with hypodermic inject the novocain and adrenalin. There is one point in the use of this which I think is often overlooked and that is going through the tissues posterior to the tonsil. There should be practically no hemorrhage and absolutely no pain. Then, as one of the speakers suggested, grab your tonsil and pull it well out of its bed—that enables you to make your dissection in a most perfect manner without any sharp cutting instrument, except in cases where there are marked adhesions. The final snipping off of the tonsil, whether by guillotine, snare or scissors, is perfectly immaterial. One other point I wish to emphasize, and that is to check all oozing of blood with peroxid, then carefully apply 25% of the tincture of iodine.

Dr. Arthur Irving Weil, New Orleans, La.—I am an advocate of the Beck method of operating, wherever possible. I have used that method in probably over fifteen hundred cases, certainly well over one thousand cases, and I have found the method very satisfactory. There are, however, certain limitations in the Beck method. In the first place, I have found it is applicable possibly in 90% of the cases, while there is a certain percentage, probably 10%, in which the Beck is not entirely applicable, because the tonsil is bound down by adhesions, or objections of that sort. So start out with the understanding that there are probably 10% of the cases in which the method is not applicable. Beck himself has found about 10% in which his method is not applicable.

I have, in the last three or four weeks, been using the Makuen method, the method spoken of by Dr. Lynch and others, and I want to say that I find that this method is a distinct improvement over the old Beck method. With the old Beck method, although the results are usually very pretty, I think, probably better than any other method applied up to this time; nevertheless, it did happen in some cases, when the whole of the capsule was removed, that we left the pillars somewhat more stripped than we wished for. In probably thirty or forty cases in which I have used the Makuen method I want to say that that objection has been almost entirely wanting; that after the second snare is applied and the tonsil removed part of the capsule remained hanging there as a sort of fringe over the edges of the tonsillar pillars, and it is often necessary, as Dr. Lynch has said, with a retractor of some sort, to lift the remains of the capsule out of the way so as to see in the fossa and see what the condition there is. I can not entirely agree with what Dr. Lynch has said in regard to this method, that it diminishes the hemorrhage so completely. I think the hemorrhage is diminished to a certain extent, but I have found that there is no great difference in this respect from the old Beck method. The average, as a rule, is less than with any dissecting method.

Dr. D. Henry, Oklahoma City, Okla.—I have removed quite a number of tonsils with the Sluder method and quite a number with the Beck instrument, more often using the LaForce modification of the Sluder instrument. In 80% to 85% of my cases I find this very satisfactory. More especially in children up to nine or ten years of age, as mentioned by Dr. Dupuy. In the other 15% or 20%, in the buried or partially buried tonsils, I find it possible, and in most cases not difficult, to push the tonsil through the aperture and remove it by the Sluder method. But it takes so much pressure, which so bruises the surrounding tissues, that you get so much inflammation following that I do not think this the best method for these cases. In such cases I first separate the anterior and many times the posterior pillar and then often use the Sluder instrument to remove the tonsil; but I see but little advantage in this method over the snare after you have so loosened the pillars.

I have used the Makuen method as mentioned by Dr. Lynch in half a dozen cases only. These were practically bloodless. My snare, the Pierce-Mueller, has a large round opening at the end of the canula, through which the wire is drawn that keeps the wire too far removed from the Sluder. In two instances this left some tonsil tissue. I am having a canula made with a flat end and expect with this instrument to carefully try out this Makuen method.

Personally I think the removal of about 15% to 20% of tonsils, the buried and partially buried ones, by any of the Sluder methods without first separating the pillars is not scientific surgery. In the other cases I think it a very quick, safe and efficient method.

Dr. E. R. Carpenter, El Paso, Texas.—There are many methods of removing the tonsils, and there are certain objections to any method. The class of tonsils shown here, to demonstrate the nice technique of the Sluder and the Beck-Mueller methods, could no doubt be as nicely removed by other methods, provided the operator has had sufficient practice with the technique. To remove the glandular tissue and leave the capsule intact is satisfactory in the majority of cases, but this is a difficult thing to do, and there is a certain percentage of cases in which we find an old chronic, unsuspected pus formation behind the capsule. Such cases give a history of having had rheumatism or syphilis, and have been under treatment for all kinds of trouble. The tonsils in these cases usually appear normal, and in my experience were removed purely with the idea of getting rid of the glandular tissue, which we know is at times responsible for constitutional disturbance. On the whole, a complete removal of the capsule as a routine is the safest and most satisfactory procedure in my practice.

Another matter that deserves our consideration in tonsular work is the question of recurrence. I have seen glandular-like tissue reproduce in the fossa until an expert would declare the tonsil had never been removed, yet to my certain knowledge the removal was apparently complete in cer-

tain cases. I have had this reproduction to occur a few times in my own work, and we should be cautious in criticising the work of others.

Dr. M. E. Taber, Dallas, Texas.—I have been removing tonsils for sixteen years. I began rather young. I have been condemned for using the Matthew method at home and in Houston, Texas, but I was bold enough twelve years ago to report a number of very severe hemorrhages, my confreres using the same method. There were a few of them that admitted that I was drifting along the right track. I have had all kinds of hemorrhage and the various complications that all of us have had with the Matthews, with the dissection, and with both the blunt and sharp instruments, with the scissors, etc. I began sixteen years ago. Now, some one has said that a specialist doing throat work has earned this criticism, and that he proceeds to do the work in the most difficult manner. In listening to the discussion, it strikes me that is well deserved. We go into detail, and we describe this method and that method. I believe that the method is the one which we have used and worked up. It is not any particular method. Now, the Sluder, I operated it in St. Louis this summer, after what I saw of Dr. Farrington's method, modification of Dr. Matthews' method. There was used a stiff wire snare with the forceps attached, leaving the anterior pillar inward, and dissecting it carefully. The operation was done without any pain and hemorrhage, it was so ideal it was a shame, because he should have had hemorrhage and he should have had a great deal of pain. I don't believe in novocain. I still believe in adrenalin, a ½% of 1% cocaine. Speaking of the long needle, I don't inject the cocaine into the stroma of a gland itself, but go directly into the pillar, where you make a stab first in the fossa through the anterior pillar; I make four quick stabs into the base of the gland; then, as a matter of course, I believe I can do without, I take the needle into the posterior portion. I believe the long needle is of service in the base below the tongue. Being delivered in the right area, it secures anesthesia. Now as to whether you use the Sluder method, or you use the snare, the Beck method, or the straight Matthews, or the old snare, or even the old Matthews instrument, it is all right, providing you don't produce too much retraction. We see cases, all of us, that we have done years ago. I saw one the other day done thirty-nine years ago. It was just as beautiful an operation as we can do today, done with the old Matthews instrument, but of course that's an exception. We are going far here when we say that these specimens could be done by any method. I have a little Sluder instrument in certain cases that I see that I can drop in with a little pressure. It is done quickly. However, the speed at which a tonsil is removed is a thing that we had better get away from. It is not the speed. It is the firmness with which you remove it. Whilst you remove all the glands please don't criticise your brother as I have done in the past, because I don't care what method you use, now and then you will find some new tissue develop there, and take on the significant character occasionally of attaching itself to tonsil and the patient go on to a new infection whether local or some other condition.

Dr. L. Keplinger, Waxahachie, Texas.—It seems to me that common sense is the principle that should govern us in each and every operation, and I am of the opinion that no method is adapted to all cases. If it were so, there would not be the great number of instruments that have been invented for the removal of tonsils. I have had occasion to see different instruments and each doctor would recommend his own instruments. I have tried all the methods, but of all of them I also used the McCurd, which I regard as one of the very best. However, the principle is the same, and the difference is so slight. The only objection I have to that instrument is very often, in pushing through, the fibres will hang, and then you have to tear them, and then you have to pull your instrument out and the reaction is great. I usually use the snare. However, I have done just as clean an operation, as nice an operation, as I have ever done in any way, or have seen any one else do it, with that old-fashioned tonsil instrument at home. In some cases it acts very well, so it occurs to me that in each and every case that it comes to us, we have got to exercise judgment as to how we will operate, and what instrument we will use; I operated on a case the other day where I actually removed a little old submerged tonsil. I dissected it out, and moved it. I did a clean job of it, but it took me some time to do it.

Dr. S. P. Israel, Houston, Tex.—There is just one question—that is with reference to doing the Beck operation under local anesthesia. In these days I would much rather do it with local anesthesia than with general anesthesia.

Dr. Homer Dupuy, New Orleans, La. (Closing)—Evidently from the trend of the discussion the last word has not yet been said as to the best way of removing tonsils. My object in presenting an analysis of five hundred cases of tonsil extirpation by a particular method was to stress some of the good features presented by this method and at the same time to show its limitations.

Dr. McReynolds fails to grasp the predominant feature which underlies the mechanics of this method. I wish to emphasize that the wire loop in the Beck instrument engages the whole of the base of the tonsil with uniform force. Again, it is important to remember that when the tonsil is successfully Sluderized—that is, when it is pushed through the ring of the tonsillectome, the whole cryptic surface of the tonsil is everted. On the completeness or incompleteness of the eversion depends the success in the removal. In working on the left side we simply transfer the whole technic; the left hand holds the tonsillectome, the right index finger pushing the tonsil through the ring. A variation which we practice is to first push the tonsil into the ring, then draw the tonsil down, using the alveolar eminence as a fixed fulcrum. These 500 cases represent those in which we successfully applied the Beck instrument. Out of a total number of tonsils operated we found this method and instrument perfectly effective in over 85% of our cases.

Dr. P. M. Farrington, Memphis, Tenn. (Closing.)—There is not a great difference as to results obtained between the Sluder and the Beck instruments if they are properly used by a competent man, who will pay attention to detail. I think the records, however, show that of the two instruments the Sluder will give a larger percentage of successful cases in tonsils which are hard to get than the Beck instrument. Very little has been said about the hump, and really about the Sluder technique, in the way he uses the instrument. I find, in talking with my friends about the country, that most of them do not use the Sluder instrument as Sluder wants it used and as he uses it himself and as he reports on its use, and unless we do that we will not get the same average results that Dr. Sluder and some of his associates obtained. In regard to leaving a portion of capsule in these operations I would like to say that in two of the cases of my series there were cavities which were not detected before the tonsils were removed, and which showed themselves only when the pure pus behind the capsule came away; there was quite a considerable quantity.

I still believe that the general anesthesia is the better plan and my experience proves it to my mind conclusively, when there are no contra-indications. I think this is true, especially if the hemorrhage produced is great, and the patient becomes thoroughly frightened. I feel much more comfortable to have them on their back under a full anesthesia and to be able, in these cases, to handle that hemorrhage should it occur.

I wish to take this opportunity of extending to all present a very cordial invitation to be with us in Memphis next year at the meeting of the Academy of Ophthalmology and Oto-Laryngology.

AUTHOR'S ABSTRACTS

Medicine.

(Continued from page 452)

trophied tonsils were the cause of nocturnal enuresis, but after removing a large number the profession realized that only a small percentage can be benefited by the operation; the same view prevailed regarding phimosis.

Recently a view has been advanced that nocturnal enuresis is caused by hypothroïdism; numerous children who wet the bed were found to present symptoms of lessened thyroid secretion. These cases are markedly benefited when fed on thyroid.

The treatment of the condition is simple if cause is found; otherwise advise a line of treatment consisting of general management, diet and drugs. Give the child a light supper with little or no fluids; awaken the child at night to urinate; appeal to child's pride.

Medicinally atropia is the best drug.

Holt advises to use one grain of the alkaloid to two ounces of water, one drop to be given at 4 p. m. and the other dose at bedtime, tonics to be given to anemic children. When no improvement ocurs try dry thyroid extract, one grain t.i.d. You can add a little iodide of potassium to render the thyroid more active.

Benzol in Leukemia. By F. H. Smith, Abingdon, Va. Journal of the American Medical Association, May 22, 1915, pp. 1734-1736.

This paper is a continuation of a report appearing in the Journ. Amed. Med. Asso. of March 21st, 1914, of a case of myelogenous leukemia treated with benzol and under observation 19 months. The author introduces a table recording the blood changes, changes in the spleen and the medication for the period covered.

He is led to the following conclusions:

(1) Benzol is a remedy of remarkable potency;

(2) The effectual range of dosage in this case (a boy of 14 years) was 20 to 25 drops three times daily;

(3) "Benzol is a two-edged sword." The practitioner who prescribes the drug without frequent blood counts is courting disaster through aplastic anemia from overdosage;

(4) On the other hand, there is evidence indicating stimulation of leucopoietic tissues from too small dosage;

(5) Fluctuations in the size of the spleen do not run parallel with fluctuations in the blood count; one cannot be taken as an index of the other.

(6) We still have no proof that benzol is specific. In fact, it is dogmatically stated that it has not and will not "cure" this case. On the other hand, he predicts that a fatal outcome from chronic progression of leukemia; an acute fulminant transition; or from aplastic anemia;

(7) Yet when all is said of its shortcomings and of the dangers that lurk in its use, the chemical has a most remarkable inhibitory influence. It may have a distinct place in therapy, even if its action prove short of specific, and merely symptomatic, staying or inhibitory.

The Contracting Factor in Neoplastic Growth. By L. J. Simonton, Cumberland, Md. Virginia Medical Semi-Monthly, Richmond, Va., Sept. 25th, 1914.

In a paper read before the Medical and Chirurgical Faculty of Maryland at Baltimore, April 29, 1914, L. J. Simonton of Cumberland, Maryland, expressed the belief that malignancy is an anaphylactic reaction to homolgous protein, said protein being the result of the metabolic activity of embryonic tissue. Long continued Katabolism producing the necessary sensitization. He also believes that pregnancy represents a physiological accommodation to or toleration of embryonic intoxication. Loss of said accommodation or toleratin meaning Eclampsio. In other words, an antiembryonic body is formed in pregnancy (now shown by the Aberhalden test) in non-eclamptic cases.

A searching investigation has failed to divulge a single case of synchronous pregnancy and malignancy and the Aberhalden tests for pregnancy and for early cancer show these two conditions to be fallacies the one for the other. Doctor Simonton would like to see a number of advanced (anaphylactic) cases of malignancy treated with blood-serum derived from a plethoric non-eclamptic pregnant woman, which he believes will contain the necessary antibodies for the curtailment of the anaphylactic process now known by the indefinite title of Cachexia.

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DR. H. A. MOODY
Managing Editor Southern Medical Journal

IN MEMORIAM

The heart of every member of the JOURNAL staff is heavy with sorrow over the death of the Managing Editor, Dr. Moody, who, on Sunday, the sixteenth of April, at his home in Mobile, succumbed to a brief attack of la grippe, with renal complications.

Our intimate association with Dr. Moody for the past ten years gave us the opportunity of knowing and appreciating him as one of the truest and noblest characters that ever lived on earth as one of those who make better and happier all whose lives touch theirs. His clear head and pure heart made his counsels invaluable, and always dependable, when matters of policy regarding the JOURNAL were under consideration, and much of its literary

excellence has been due to his remarkable powers of expression. Indeed the JOURNAL could not have merited the splendid recognition which it has received without his able and enthusiastic assistance. Most of the editorials published in the JOURNAL have been products of his brain and pen and he prepared the news items each month. He also read the proofs of the JOURNAL, and we believe that no other medical publication has had fewer typographical or other errors.

By inheritance Dr. Moody had a brilliant and acquisitive mind. He was thoroughly educated in his youth and having been an enthusiastic student of science and literature throughout more than half a century of his professional life, Dr. Moody had acquired remarkable scientific and literary attainments. He was always eager to learn and up to the time of his death, at the age of 74 years, his mind seemed as bright and as pliable and as open to scientific truth as that of a young college man. Those who knew him well often marveled that he thought and expressed himself in the terms of the latest scientific literature.

Dr. Moody was one of the first to offer his services to the Confederacy and he entered the Southern army when nineteen years of age. As chief of scouts under the intrepid Forrest, he proved that he was as daring physically, as he was courageous mentally. Some of his exploits and hairbreadth escapes as a scout and spy, often within the Union lines, were thrilling. Though he proved a successful scout, and enjoyed the life, he was interested in medicine and in the last years of the war was transferred to the ambulance department in which he served with distinction until the end of the Confederacy.

After the war he pursued his cherished desire to study medicine and graduated in the Medical Department of the University of Louisville. He then located in Mississippi where, during the dark days of reconstruction, his talents and qualities of leadership made his compatriots call upon him to serve in the Mississippi legislature to aid in wresting the state from the diabolical rule of negroes and carpetbaggers. He soon became a political leader in Mississippi and was tendered the nomination for Congress in his district but declined the honor because he was unwilling to sacrifice his chosen profession for political preferment.

Dr. Moody later located at Florence, Alabama, where as a practitioner of medicine, he made a great reputation; and no physician was ever more beloved by his patients, among whom could be mentioned many of the most distinguished Alabamians of this and the preceding generations. In 1895 he was tendered the Chair of Materia Medica and Therapeutics in the Medical Department of the University of Alabama in Mobile and he gave up practice to devote all of his time to teach the branch which he had so successfully practised for many years. As a teacher of practical therapeutics he probably did not have an equal in this or any other country. He believed in the rational use of medicines and taught his branch by having the students handle and become thoroughly familiar with the physical properties of every kind of drug, including the crude forms and finished products. The materia medica laboratory which he developed in the Medical Department of the University of Alabama is not excelled anywhere and other medical schools might well profit by his methods of teaching.

The articles in the Department of Therapeutics first begun in the Mobile Medical and Surgical Journal and continued in the Gulf States Journal of Medi-

cine and Surgery and in the SOUTHERN MEDICAL JOURNAL up to about a year ago, were all written by Dr. Moody. He also wrote a number of editorials which appeared in the JOURNAL at various times on the teaching of materia medica and therapeutics, which he believed was a neglected department in most medical schools. One of the last editorials that he wrote, was on this subject, and it is published in this number of the JOURNAL.

Dr. Moody was one of the pioneers in the upbuilding of the Medical Association of the State of Alabama. He was a confrere and devoted friend of its great founder, Dr. Jerome Cochran, who was also the father of the Alabama system of public health. Dr. Moody was President of the Medical Association of the State of Alabama in 1899 and was a member of the State Board of Health for many years.

Dr. Moody's life was devoted to medicine and he contributed many articles to various medical journals and meetings of medical associations, though he found time to make a number of notable contributions to general literature. He was the author of a historical novel entitled, "A City Without a Name," a tale of the Incas in ancient Peru, which was a model of literary excellence, with a plot so well conceived and altogether so interesting that it was one of the most widely read books published at the time—about twenty-five years ago.

Dr. Moody's loyalty to his friends, his devotion to principle and his courage at all times to stand up for his convictions, made him tower above ordinary men. He was a gentleman of the old school, having all the refinement, courtesy and distinguished bearing of the men of the antebellum days that made the old South famous.

They buried him, in the sunshine that he loved so well, at Florence, on the banks of the Tennessee, and the mocking birds in the trees nearby joined in the requiem that was sung over his grave. After "life's fitful labors" and until the resurrection day he rests by the side of his father and mother at the fairest, sweetest spot in all the world to him. We shall never see his mortal form again, but we feel that the impress of his life will live through the ages, because his great mind and soul have joined

"The Choir Invisible
Of those immortal dead who live again
In minds made better by their presence; live
In pulses stirred to generosity,
In deeds of daring rectitude, in scorn
For miserable aims that end with self,
In thoughts sublime that pierce the night like stars
And with their mild persistence urge man's search
To vaster issues."

THE TEACHING OF MATERIA MEDICA AND THERAPEUTICS.

In "Public Health Reports," issued by the United States Public Health Service there is an article on "The Pharmacy of Useful Drugs" which touches on several points of interest. After speaking of the work of the sub-committee of the A. M. A. council on pharmacology and therapeutics in cutting down the thousands of official and non-official drugs in the old pharmacopeas to a reasonable number it goes on to state that: "In round numbers the present list of useful drugs includes 450 titles, of which 231 may be classed as drugs and chemicals, 173 as preparations, 43 as definitions of forms of drugs and 13 as cross references." The object of this condensation is supposed to be to provide medical schools with an authoritative materia medica and therapeutics that that could be taught efficiently in the 230

or more hours available under modern schedules. Even then the teacher can impart useful instructions only on representative drugs. He cannot attempt to teach well two distinct drugs at each available hour, which would be necessary were the whole 450 to be considered. The problems arising from the contradictory conclusions whenever the verdict of pharmacological experiment contradicts that of long established clinical experience must be thoroughly discussed and unfortunately such differences are numerous. It is apparently true that medical colleges are beginning to pay more attention to materia medica and therapeutics than has been the case in the past. There is now a fair prospect that in future students of medicine will be given ample instruction to develop an efficient therapeutic armamentarium. Probably it is not alone the work of the sub-committee in condensing the list of useful medicines that has wrought this very desirable change. The criticisms of the lay public on the helplessness of the recent graduate in finding suitable remedies when confronted with disease may have had an effect. Such an expression as the following has often been heard: "These young doctors don't know anything about practicing medicine unless you give them something to cut on; then they are all right." There was some foundation for the criticism, and no wonder, for often the student received very little instruction on that point while in college but was expected to absorb the necessary knowledge at the clinics or in the dispensary. Yet the instruction there available was frequently so crystallized by years of repetition on the part of the instructors that it was not suitable for use in private practice. Frequently after the diagnosis had been carefully made the treatment would be indicated only by a number, say "96," or by a term such as "mixed treatment," or "alterative," and the constituents of those mixtures, though probably originally specified, had long since been forgotten by the students. Even though he might remember those ingredients he would know only their names, for his school gave no instruction in materia medica. How, then, could he know how to practice medicine? It is well for the profession and for its patients that this aspect of medical education is undergoing a change for the better. New graduates will henceforth be less dependent on proprietary remedies and the detail man.

THE NATIONAL COMMITTEE ON THE ERADICATION OF MALARIA.

Probably the most important public health problem in the United States, and the one easiest to solve, is the eradication of malaria. The malaria surveys by Surgeons Carter and von Ezdorf, with their confreres in the United States Public Health Service, prove the wide distribution of the disease in various Southern States; and the results which they obtained in two heavily infected localities are encouraging to those who hope to see the time when malaria will cease to be endemic in civilized countries. With the lessons of sanitation, as applied to Havana and the Canal Zone known to the American people, it seems remarkable that we have not had the business judgment—without discussing the humanitarian side of the question—to make a systematic effort to combat the ravage of a disease that costs our country not less than $100,000,000 annually. The South bears probably three-fourths of this burden, and that malaria, more than any other disease gives this region the undeserved reputation of being unhealthful, cannot be denied.

The wonderful resources of the South cannot be developed and our region can never enjoy its fullest prosperity until we can say to the progressive citizens of other sections: "Come, make your home in the South. We have the cheapest and most

fertile lands in the world, where God's bright sunshine, seasonable showers and mild winters provide conditions for the greatest diversity and largest yields of all the crops that can be grown in other sections, and where two or even three crops can be grown each year; and in addition, it is the only region of the earth where in normal times the greatest of all money crops, cotton, can be raised profitably. The South offers you a wonderful opportunity where you and your children may prosper and enjoy the blessings of health, for malaria, the enemy that you have feared, no longer exists."

One of the objects of the Southern Medical Association has been to bring the medical profession of the sixteen Southern States together in the effort to eradicate malaria and other tropical diseases that have interferred with the agricultural and industrial development of the South. The Malaria Commission was created for that purpose, symposiums on malaria have been held at every meeting of the Southern Medical Association, and the frequent publication of articles on that subject in the JOURNAL have no doubt aided in stimulating the interest of the practitioners of medicine in the sixteen Southern States regarding the need for organized efforts in the campaign against malaria, and the time is ripe to begin the work on a large scale, in a thorough and systematic manner.

Recently Dr. Frederick L. Hoffman, statistician of the Prudential Insurance Company and perhaps the ablest statistician of this or any other country, has become much interested in malaria. Dr. Hoffman has been for many years a close student of Southern health conditions. A number of years ago he studied the race problem from the unprejudiced statistical viewpoint and the book by him entitled, "Race Trait and Tendencies of the American Negro," remains up to this time the most rational and scientific treatise on that subject. He does not regard malaria as entirely a Southern problem, though statistics show that it is more prevalent in the South than in other regions of the United States.

In this number of the SOUTHERN MEDICAL JOURNAL we publish an article entitled "A Plea for the National Committee on the Eradication of Malaria," in which Dr. Hoffman clearly brings out the need for such an organization to co-operate with the various agencies that are already working on the malaria problem. Dr. Hoffman has requested a number of distinguished gentlemen, representing different vocations, to organize a National Committee on the Eradication of Malaria. The list of those whom he has selected appears in this article. They are all men who are particularly interested in malaria, some in the sociological, others in the scientific, public health or engineering phases. A great majority of those whom Dr. Hoffman has invited to participate in the first meeting of the committee, to be held in Washington during the American Congress of Physicians in May, are enthusiastic members of the Southern Medical Association. It is contemplated that this committee shall also meet each year at the same time and places with the American Medical Association and the Southern Medical Association. The deliberations of this group of representative men will no doubt play a prominent part in the eradication of malaria in the United States.

THE NEGRO MENACE TO PUBLIC HEALTH.

The phrase, "the negro question," is very familiar to the reading public, but it is generally used in a political sense. There is another standpoint, however, equally if not more important than his political standing, from which to consider the effect of the negro population upon the general welfare. This is the question

of his influence upon health conditions. There are nearly ten million negroes in the United States, or ten per cent. of the total population. Of these over two million are mulattos, and their rate of increase is more rapid today than in the years that have passed. This speaks in indisputable terms of the increasing immorality that is caused by their social intercourse with the white people, and immorality inevitably bears in its train most regretable morbidity. This evil influence prevails on the largest scale in the Southern states, in some of which the negroes constitute more than fifty per cent. of the entire population. The census reports show the relative proportion of deaths from certain specified diseases in white and colored citizens. Tuberculosis may be taken as a criterion. In Kentucky the deaths in each 100,000 are as follows: Whites, 170.6; colored, 432.2. North Carolina, white, 163.3; colored, 351.2. Alabama, white, 122.2; colored, 404.1. Georgia, white, 111.9; colored, 309.2. These are but a few figures selected from a mass of statistics, but with few unimportant exceptions all the figures tell the same tale, namely, that the death rate from infectious diseases is from three to four times greater among the negro than among the white population. But their misfortune in this extra susceptibility is a serious menace to the health of the white people among whom they reside. Probably nowhere else are the relations between an inferior and subservient race and the superior and controlling people so intimate and kindly as those which exist between the white people and their colored servants in the Southern states. The negroes look to the white people for literally everything that is necessary to their existence except the air they breathe, the light by which they see, and the water which they drink and in which they ought to bathe.

The employment given them by the white people is, except in farming communities, their principal source of livelihood, supplemented as it almost universally is by many small gifts and numerous perquisites.

This dependence is not all on one side, for the whites feel utterly lost when deprived of their accustomed servants, and when such is the case they employ, as a rule, the first negro man or woman who offers to do the work. It is rare indeed that any questions are asked concerning the home circumstances or the moral character of the negroes employed as cooks, washerwomen, gardeners or stable men. The women who cook our food, make our beds, wash our clothing and assist in the care of our children may be Mesalinas in their private lives so far as we know. The most loathsome or infectious diseases may be raging in their homes, yet we know it not. Even when their skins plainly show syphilitic eruptions the circumstance will seldom be noticed. Many times in the experience of Southern physicians outbreaks of measles, scarlet fever or diphtheria among the children of well-to-do white people have been traced to the homes of laundresses where the disease flourished unattended and unreported. In a remarkable paper read before the Dallas meeting of the Southern Medical Association by Dr. Marvin L. Graves, of Galveston, and published in this number of the JOURNAL, he says:

"Many and repeated examinations over a period of years have shown me conclusively the not infrequent occurrence of specific infection among those who have had no opportunity to contract sexual diseases. I have found it present in children of both sexes, in young men and young women of immature years, and in those whose lives are sheltered in such a way that infection would seem to be impossible. When we remember that the negroes of the South, our servants, in intimate association with our families from the cradle to the grave, are widely infected, we can begin to understand how innocent infection may be widespread."

What can be done to remedy this lamentable condition? Absolute insurance against it could be secured only by a revolution in the domestic life of the Southern people, a revolution that would banish the negro, black, brown or yellow, from our homes and our employ; which is simply an impossibility. We need them in our homes and there is no available substitute, and if they were deprived of our support their condition would be one that would lead to anarchy. At present nothing seems to be doing to protect ourselves and our families from this horrible danger, yet it is not beyond the reach of a remedy. Three things are necessary to correct the condition; resolution, organization and energetic action. The resolution should be a determination to relieve the condition by obliging every employee before being hired to submit to a medical examination which should decide upon the health condition of the applicant. It should also be a part of the plan that those found to be diseased should submit to such medical treatment as the examiner should prescribe. Without a certificate from the official examiner that the applicant could safely be employed in domestic duties, no such should be accepted. Such work as this must be general to be effectual, and it can only be made general by an organization of the white people interested, that shall be widespread and legal. To accomplish this will require energetic work, and the burden of its expense should be borne by the state through the agency of the state and county boards of health; for it is a question than which no other is more important to the present and future general welfare. We cannot do without the work of the negroes, yet it is dangerous to the health of our families to employ them unless infectious and contagious diseases can be eradicated from among them. Only the strong arm of the law, backed by the organization of the citizens, can accomplish that, even as we now rid our cities of the infection of smallpox or leprosy. There is the problem, there also is the answer. Who will undertake it?

THE MISSISSIPPI LAW FOR THE PREVENTION OF BLINDNESS.

The law recently passed by the legislature of Mississippi, largely through the efforts of Dr. Robt. S. Curry, for the prevention of ophthalmia neonatorum is so plain and practical that its effect should be prompt and satisfactory. Its definition of the term "inflammation of the eyes of the new-born" is clear and cannot be misunderstood. It includes "any inflammation, swelling or redness of either or both eyes of any infant, either apart from or together with any unnatural discharge from the eye or eyes of such infant, independent of the nature of the infection if any occurring any time within two weeks after the birth of such infant."

The law makes it the duty of any person in any way connected with the infant or mother at childbirth or within two weeks thereafter, who knows the conditions thus described to exist, to report the fact to the local health officer or to such official as the State Board of Health shall designate. It defines the duties, in this regard, of doctors, midwives nurses and others, and makes the use of prophylactic measures mandatory. It provides fines for violation of the act amounting from "not less than $50," to "not to exceed $200."

The enactment of this statute should be a benefit to the children of Mississippi directly, and by the force of its example to such other states as have thus far failed in this duty to their present and future citizens, for it will tend to encourage those higher ideals of the duties of citizenship which alone can elevate a people, and to protect thousands of unborn children from irremediable misfortune.

It will help hasten the day when every Southern state shall protect its coming infants from this curse of careless service at parturition and from the unnecessary burden of avoidable helplessness.

The authorities and supporters of this bill deserve well of their people.

THE AMAZING PERFORMANCE OF DR. RICHARD CABOT.

Members of the medical profession who have entertained the idea that they were rendering mankind an almost holy service may no longer enjoy that pleasant delusion. Like Balaam of old, they have been shocked by an utterance from an unexpected source and their sins have found them out. Dr. Cabot has spoken and the Christian Scientists, Osteopathists, Mental Healers and all the other hosts of quackery rejoice, while those who practice regular medicine must hide their heads in shame. For Dr. Cabot has made a discovery, namely, that, practically speaking, it is only in hospitals and with "team work" can scientific medicine be practiced, though whether it takes nine or eleven to make a "team" he does not specify. Worse than that, he insinuates that doctors are guilty of dishonest practices in that they not only encourage unnecessary medication but also actually delay the recovery of the patients who have trusted them, so that more visits can be made and charged. Surely of all forms of breach of trust this is the worst. These serious charges he makes, not only against the few black sheep in the family, who, as in other professions, unfortunately exist, but upon the entire profession; and his offense is not lightened by his naive insinuation that his own hands are not clean. In fact he has so overstated his case that what little truth might lie at the bottom is hidden by the murky smoke of his insinuations. If it were Dr. Cabot's intention to correct an evil which he had discovered within the bounds of his profession he should have appealed to his erring brethren through the pages of some of the many reliable medical publications. Any of them would have been glad of a series of articles from a man of Dr. Cabot's reputation. Or he could have enjoyed a respectful hearing before state, regional or national medical associations. But no. He selected as his mouthpiece a literary magazine of wide general circulation. It was in the American Magazine for April, 1915, that this amazing performance was staged, wherein Dr. Cabot in an article entitled "Better Doctoring for Less Money," belittled the rank and file of the profession that has honored him on many occasions. No one denies that such a hospital as he describes is a blessing to those who can avail themselves of its facilities, but how many such institutions would be required to outfit the State of New York alone for such service? In view of such an impossibility it is unfortunate to see a man of Dr. Cabot's prominence discredit the general practitioner, who is conscientiously putting forth his best efforts to practice scientific medicine; and who, in the great majority of cases, can, without assistance, make an accurate diagnosis and apply the proper treatment. In the cases in which the diagnosis is obscure, or special treatment is indicated, the general practitioners whom we know call in consultants, or refer such patients to specialists in various departments of medicine and surgery.

It is pitiful to see a man of even moderate abilities make such a mistake. Dr. Cabot's intemperate utterances will be quoted by faddists for many a year, misleading the weak and encouraging the uninformed to patronize every futile pathy that claims a temporary popularity.

THE INEFFICACY OF SOME PENALTIES.

A great deal of exultation was felt by those who hoped for the legal protection of the people against medical frauds, when it was announced that more than fifty actions under the Sherly Amendment to the Food and Drugs Act had terminated successfully and perpetrators had been punished. It was hoped that drugs and their compounds would no longer be "falsely and fraudulently labeled" and so foisted upon a gullible public. A glance at the published results, however, rather shakes one's faith in the efficacy of the punishment inflicted.

For instance, one man whose panacea was warranted to cure 26 separate and different diseases, ranging from typhoid fever through sunstroke, epilepsy, appoplexy, etc., to croup, and whose nostrum consisted of mostly alcohol, with "opium alkaloids, camphor, capsicum, and vegetable and extractive matter," was convicted of "false and fraudulent statements" and of supplying an article containing "morphine and other opium alkaloids of a poisonous and deleterious nature," and fined in the enormous sum of $100! Though our sympathies must be somewhat excited by the weak, the young and the ill his "medicine" has poisoned, yet the heavy (?) burden of this fine of One Hundred Dollars will doubtless be a warning to this manufacturer—to go and sin some more.

In another case four thousand and ninety-two bottles of a medicine were seized and libeled as falsely labeled. "A judgment of condemnation and forfeiture was entered." Then the medicine was restored to the manufacturers upon payment of costs, and the execution of a bond that the goods would be truthfully relabeled before sold. The burden of those costs must have been heavy on those *poor* patent medicine manufacturers. They will be more careful about the verbiage of their labels hereafter. In view of the profit made by such manufacturers the penalties must seem extravagant to them, must they not?

With our present information it looks like a travesty on justice, but there may be extenuating circumstances.

THE LOCATION OF HOSPITALS.

Very frequently when it is proposed to erect a sanatorium or a hospital in a small city or town the owners of property near by or adjacent to the locality selected energetically object, and the reason generally assigned for their hostility is that it will endanger the health of people living near to the proposed institution. With the possible exception of a smallpox hospital there is not the slightest danger of any disease being disseminated from a decently managed hospital or sanatorium, for such a thing as infection traveling on the wings of the wind is not credited in these modern days.

The real reason for opposition to the location of a sanatorium or hospital in the residence part of a town is the fear that possible purchasers of real estate may be repelled by its proximity and refuse to buy, thus lowering the money value of such adjoining property. The issue has recently been raised in the city of Northfield, New Jersey, where the city brought suit against Atlantic County to prevent the county from erecting a tuberculosis hospital within the town.

Although the State Board of Health had approved of the site, yet the city alleged it would be a menace to health and would depreciate property in the vicinity. The New Jersey Chancery Court decided that the evidence did not justify a conclusion that any danger to health could exist from the institution if "properly operated," and that the claim that it would reduce the value of adjacent real estate,

"standing alone, cannot justify the relief sought."

No doubt there are sometimes circumstances outside of danger to health that justify objections to the erection of such institutions in the locations chosen, but generally the objections are entirely speculative and do no honor to the objectors. Carried to their legitimate conclusion, such objections would exclude sanatoriums and hospitals from every desirable spot in civilized communities, as some one might be willing to pay a little more for adjoining acres if the institution were not there. The New Jersey court acted justly and wisely, but what a standard board of aldermen, controlled by political considerations, would have done in such a case is not hard to guess.

THE ASSOCIATION OF THE MEDICAL OFFICERS OF THE ARMY AND NAVY OF THE CONFEDERATE STATES.

Dr. Samuel E. Lewis, Secretary of this organization, announces its next annual meeting during the Reunion of the Confederate Veterans, at the Hotel Tutwiler, Birmingham, Ala., May 16-18, this year.

Under the new constitution, in addition to the former membership of surgeons, assistant surgeons, acting assistant surgeons and chaplains, it is now provided that all Confederate soldiers or sailors (though not then medical officers), but who after the war became and are now regular practitioners of medicine in good standing; and all regular practitioners of medicine in good standing who are the sons or grandsons of Confederate soldiers or sailors, have been made eligible to membership and are hereby invited to be present.

The living Confederate surgeons are few but they and their descendants should unite with this organization which aims to perpetuate the memory of the splendid achievements of the Medical Corps of the Confederate Army whom "fate denied victory but crowned with glorious immortality."

SPECIAL ARTICLE

MEDICAL PREPAREDNESS.

The lesson of the European war is that of preparedness. This has found its echo in our own country, where the question of the day is that of national preparedness against war. We are, however, a people of peculiar temperament, holding our allegiance with tenacity to but two issues, our politics and our religion. I trust we as a nation will add preparedness as a third and vital issue. We are a forgetful people, carelessly throwing aside a lesson learned at the expense of war. And, judging from past experience, if the war in Europe were to end today in a year the question of preparedness would become entirely academic. Preparedness is, therefore, a question that can be kept alive only by educating public sentiment to understand that preparedness is the premium on the life policy of the nation. While the whole question is at this time of interest to us as a nation, the question of medical preparedness is of the utmost interest to us as medical men, and the medical preparedness of our army depends upon public sentiment, a sentiment that will demand a trained personnel of sufficient strength not only for peace duty with the army but a medical corps of such strength as to permit of the necessary expansion in time of war, without its complete disorganization as an organized unit. This requirement was appreciated by one of our Presidents, who in a special message to the Sixtieth Congress said:

"The Medical Corps should be much larger than the needs of our regular army in war. Yet at present it is smaller than the needs of the service demand even in peace. The Spanish war oc-

curred less than ten years ago. The chief loss we suffered in it was by disease among the regiments which never left the country. At the moment the nation seemed deeply impressed by this fact; yet seemingly it has already been forgotten, for not the slightest effort has been made to prepare a medical corps of sufficient size to prevent the repetition of the same disaster on a much larger scale if we should ever be engaged in a serious conflict * * *."

The medical history of the camps of the Spanish-American war is a sad commentary on medical preparedness—yet in less than 10 years the lesson was forgotten! Public sentiment makes a war popular, or in other words makes for a national war, on the other hand nothing arouses the indignation of a people quicker than medical unpreparedness, and when a war becomes unpopular because of unnecessary suffering and loss of life, in a country such as ours, public sentiment influences the result of a campaign and determines in no small measure, victory or defeat. It will be public sentiment that forces legislation towards national preparedness, in so far as the combatant branches of the army are concerned, and it will be only by the expressed sentiment of the medical profession that we will obtain medical preparedness, for the public is not educated up to the question and gives scant heed to the matter until the stress of war shows the insufficiency of medical preparedness for war.

In past wars the lack of medical preparedness was a national humiliation. The unnecessary suffering and the lives uselessly sacrificed caused in each war a wave of horrow and indignation to sweep over the country, yet in a few months this was forgotten. In case of war, past experiences would be repeated, another wave of indignation, another report of a "Sanitary Commission," or another "Dodge Report," with its recommendation for "a large increase in the medical corps." The lesson again learned would be forgotten within a few years because of the lack of public sentiment demanding medical preparedness.

What are the requirements of a medical corps? To the uninitiated the answer is a matter of surprise, for few know that in war more than one medical officer is required for each 100 men under arms; for example, an army of 200,000 men in the field, with but one base and one line of communications will require, according to the "Tables of Organization," 2,035 medical officers, allowing for only 10 per cent. of sick and wounded, and yet one battle may give us a much greater number of casualties. This is not all. The present plans are for recruit depots to supply the loss of men at the front, reinforce the army by a number equal to the casualties so that the army will always be of a normal strength of 200,000 men, the medical officer has the health of the army at the front to look after as well as its percentage of the sick and wounded, plus the percentage of sick and wounded from the number of men required to always keep the field army up to its normal strength, 200,000 men.

Austria now provides hospital accommodations in home territory for 40 per cent. of the army in the field. Upon this basis it would be necessary to provide hospital accommodations for 80,000 sick and wounded for an army of but 200,000 men, necessitating one hundred and sixty hospitals each of 500 beds, with 3,040 medical officers. These figures do not take into consideration the medical officers necessary in home territory for administration, recruit camps, supply depots, convalescent hospitals, for duty with the coast artillery, etc.—these details would require several hundred additional medical officers.

I do not mean that this total of medical officers would be needed at the beginning of hostilities, but the 2,035 with the army, from the base to the zone of advance, plus the additional number necessary in the home territory for administration, examination of recruits and other duties would be needed upon the outbreak of hostilities.

To supply the deficiency we have the Medical Reserve Corps, of 1,500 medical men—not more than 50 per cent. of whom are available for duty at the front. About 300 of this number have had some training, the remaining number necessary must come from civil life, and are without the training in medico-military administration and duties that distinguish the medical officer from the civil practitioner.

We must then commission and train as medical officers the medical men who volunteer for service. In the past this has been unsatisfactory. As, for example, in

the Spanish-American war and the Philippine insurrection it required for each year of hostilities 647 medical men in order to keep an average of 383 medical officers on duty. This was exclusive of the regular corps. This means that the department each year carry on the roster almost two men to do one man's work.

Requests for increase in the Medical Corps have been met with the argument that such increase was unnecessary for the reason that in our country there are thousands of medical men who in time of emergency would tender their services and do their utmost to assist such wounded as we might have. But the duties of a military surgeon are vastly more complex than those of his civil brother, and no matter how capable the latter may be in civil practice he can not take the place of an officer trained in medico-military duties. In case of war we expect that the professional work will be cared for almost entirely by the officers of the Medical Reserve Corps and the civilian practitioner, using the medical officers to fill those positions which in war, even more than in peace, imperatively demand a thorough familiarity with the processes of military administration. Unless medical officers sufficient in number for these positions in time of war are provided and trained in time of peace, when war comes men untrained in military administration must be called on to fill them, thus placing the Medical Department in a large measure upon a volunteer basis at the very beginning of hostilities with the same demoralizing results that have always followed this procedure.

Doctors are not medical officers, and can not be made medical officers with a knoweldge of medico-military affairs except by training. Training is the one essential. An untrained army is doomed to defeat when it comes in contact with a trained army. An army trained in its combatant branches alone, but not in its staff corps, is an army fighting under a handicap, and will suffer unnecessary losses. An example of this loss is the loss from sickness that depletes an army of its fighting strength and increases the costs and burdens of war, and pensions after the war.

History is full of examples of disintegration of armies from this cause. Sickness in past wars has caused the greatest number of casualties. We have no figures as to the ratio of sickness in the various armies now in the field. Some of these armies are short of medical officers, and most of those on duty with the armies were untrained at the opening of hostilities. England was, in October, 2,500 medical officers short of the number then necessary for duty with the army in the field. The only statistics as to losses we have are from press dispatches. Thus, the British army from April 25 to October 20, 1915, removed from the Gallipoli Peninsula 78,000 sick (press dispatch, Nov. 3, 1915, reporting statement in House of Commons by the Parliamentary Under Secretary of War.) Later dispatches, Nov. 15, 1915, stated that 90,000 sick had been taken from that single area of operations. This is a high sick rate. How much of this sickness may fairly be attributed to the shortage of medical officers, and how much to the military inexperience, are questions, of course, entirely within the zone of conjecture. It is a fair conclusion, however, from the lamentable history of our own wars that such shortage and inexperience were material factors in producing these calamitous figures.

In all past wars this country has relied almost entirely upon volunteer service. This policy of no preparation is shortsighted and expensive, for it means that, when war is imminent or actually declared, we in our eagerness to organize an army commission men as officers, in both line and staff, who are unfit for such commission, by lack of ability, by lack of training and by lack of those qualities that are necessary in leaders of men. In order that the Medical Department might not again be in the same unfortunate position, the Act of April 23, 1908, created the Medical Reserve Corps. The Medical Department is the only department of the army that has a reserve of any kind. The primary object of the Medical Reserve Corps is to have at the service of the government a body of medical officers, trained for their duties in war.

This object has not been accomplished, but the outlook is now more promising. Camps of instruction will be established during the coming summer for the purpose of giving field training to officers of

the Medical Reserve Corps. It is hoped that these camps will be even more successful than camps held last year. A correspondence course has also been established at the A. F. S. and C.'s for medical officers at Fort Leavenworth. Over 700 officers of the Medical Reserve Corps have signified their intention of completing the theoretical course offered, which is a graded course and will require four years for completion. Harvard Graduate School of Medicine has a course in military medicine.

Another plan now under way for preparedness is the organization of units. This was brought out by Dr. Crile, of Cleveland, in an address before the Clinical Congress of Surgeons at Boston, October 28, 1915. His plan was for the organization of surgical units, a plan that worked with marked success in the case of the various university units sent to Europe. The plan of the department is broader. It is to expand the surgical unit into a base hospital or hospital unit, the unit to consist of both surgical and medical services; the chief of each service to choose his professional assistants. Attached to these hospital units are the specialists, including neurologists, orthopedists, opthalmologists and aurists, pathologists, roentgenologists, dentists and such others as may be necessary. These specialists are to be selected by the chief of the medical and surgical services, but to report directly to the commanding officer of the hospital. The chief of the surgical section in addition will choose his operating room force. Ward nurses will be obtained through the Red Cross; this organization now has over 6,000 nurses on its reserve list. These units are to be organized by officers of the Medical Reserve Corps, and the chief of each service, surgical and medical, is to see that all members of the unit apply for commissions in the Medical Reserve Corps.

This is an outline of the plan of this department for medical preparedness under existing laws. What will be the result of the present movement for preparedness no man can foretell. What is required is:

1st. A Medical Corps, commissioned and enlisted, of sufficient strength to form a nucleus around which the sanitary service of an army in war can be constructed. This requires a personnel much larger proportionately than the present law provides.

2nd. A reserve of officers, enlisted men, trained in peace for service in war.

Training is the one essential for any army, and unless an army is trained in every branch it is fighting under a handicap, and if this necessary training is lacking on the part of the sanitary troops, the usual result—interference with rapid movement of the army due to the fact that the sick and wounded are not promptly evacuated to the base, criticism at home, discontent of the men, unnecessary suffering and loss of life, and as a consequence, a loss of morale, without which no army can hope to succeed in war.

Medical preparedness means the application of efficiency to the conservation of health and life; prevention of those diseases that cause the more or less rapid disintegration of an army, and then coordinating the life saving with the life destroying branches of an army.

This end can be attained only by building up public sentiment, by a campaign of education, forcing the public to realize that very patent fact that an efficient medical corps is an asset of incalculable value, not only to the army, but to the country as a whole; that an efficient medical corps means the conservation of the life of an army, saving to the country lives that would otherwise be uselessly sacrificed and sacrificed because of a false idea of economy, the weighing of the dollars and cents, that an efficient sanitary service costs the government. We need go no further back than the Spanish-American war for an example of the saving of a few thousands of dollars at the expense of several thousands of lives, the lives of soldiers who died in concentration camps.

It is well said that "Success in war is the result of adequate military preparation followed by effective military operation." This axiom cannot be followed if there is a lack of medical preparedness, and we cannot hope for the practical application of the axiom until public sentiment makes its demand. This demand will come up only after public sentiment is educated to realize the cardinal principle, that medical preparedness is as necessary as armed preparedness. This

education can come only through the teachings of the medical men of the United States.

The lack of medical preparedness of the French army has been a matter of concern to the director of the army medical service for years. Requests for increase were refused or grudgingly granted, and then only for an insufficient number of officers to meet the needs of the service. In August, 1914, war began, followed by a breakdown in the medical service. The conditions were similar to those in our own service in 1861-2, and again in 1898. The report of Reinach to the French Parliament is illuminating, and if this report were called the "Dodge Report" it would be a very fair statement of the conditions that existed in the Spanish-American war. The debates in the Chamber by Lachoud, Navarre, and Parou might have been debates upon the floor of our own Congress. The parallel is exact; this report and these debates will be found in the "Official Journal," and are well worth study. The deficiencies in the sanitary service have been corrected, but only after a year of unnecessary waste of life. In the light of past experiences and the example of the lack of medical preparedness in the present war, shall we be guilty of again entering upon a war unprepared to meet the emergency that must necessarily arise? Shall we waste lives in war in order that we may save in times of peace a few tens of thousands of dollars each year? This can be prevented only by education, by building up a sentiment among the people that an efficient medical corps is just as necessary as an efficient combatant force, and that an army without an adequate medical corps is not an efficient army; that medical preparedness means efficiency and that efficiency should be learned only in times of peace; that the sanitary personnel must be of both the regular service and of the reserve, and in numbers sufficient to perform their duties in war. This education can be fruitful only by the teachings of the medical profession, a profession whose devotion to humanity is recognized and a profession that has no axe to grind. "The Medical Corps of an army is the great conserving agency of a destructive organization. To wage war successfully, the greatest amount of destruction must be visited upon the armed forces of the enemy. For this end is required the utmost conservation of health, energies and life of the army, and to this end the highly trained and specialized medical corps is absolutely essential."

MISCELLANEOUS

EXAMINATIONS FOR THE NAVY.

The next examination for admission into the Medical Corps of the Navy will be held on or about June 16, 1916, at Washington, D., C. Boston, Mass., New York, N. Y., Philadelphia, Pa., Norfolk, Va., Charleston, S. C., Great Lakes (Chicago), Ill., Mare Island, Cal., and Puget Sound, Wash.

The applicant must be a citizen of the United States, between 21 and 30 years of age, a graduate of a reputable school of medicine, and must apply for permission to appear before a board of medical examiners. The application must be in the handwriting of the applicant, and must be accompanied by the following certificates:

(a) Letters or certificates from two or more persons of good repute, testifying from personal knowledge to good habits and moral character.

(b) A certificate to the effect that the applicant is a citizen of the United States.

(c) Certificate of preliminary education. The candidate must submit a certificate of graduation from an accepted high school or an acceptable equivalent.

(d) Certificate of medical education. This certificate should give the name of the school and the date of graduation.

(e) If the candidate has had hospital service or special educational or professional advantages, certificates to this effect, signed by the proper authorities, should also be forwarded.

Application should reach the Bureau of Medicine and Surgery not later than June 5, 1916.

Successful candidates are appointed assistant surgeons in the Medical Reserve Corps, and if so recommended are subsequently assigned to duty, with full pay and allowances, in attendance upon a course of instruction at the Naval Medical School, Washington, D. C. This course begins annually about October 1st, and lasts about six months. Upon the completion thereof the student officers are given their final examination and, if found qualified, are commissioned as assistant surgeons in the regular Medical Corps of the Navy.

Assistant surgeons are examined for promotion at the expiration of three years' service, and, if successful, become passed assistant surgeons. Promotions to the higher grades are made in the order of seniority to fill vacancies as they are

created (by resignation, retirement, or death), and for each promotion a physical and professional examination is required by law.

The pay of an assistant surgeon is $2,000 per year on shore duty, and $2,200 at sea. At the expiration of the three years mentioned in the preceding paragraph, if successful in passing the examination for the rank of passed assistant surgeon, pay on shore is $2,400; at sea, $2,640. After a total of five years in the service, pay on shore, is $2.640; sea, $2,904. Both at sea and on shore, quarters or their equivalent are provided; if these are not available on shore duty, an ample, appropriate allowance is provided for rental, heat, and light of same. An allowance of eight cents a mile is also provided when traveling on orders.

Full information with regard to physical and professional examinations, with instructions how to submit formal application, may be obtained by addressing the Surgeon General of the Navy, Navy Department, Washington, D. C.

EXAMINATION OF CANDIDATES FOR ASSISTANT SURGEON, UNITED STATES PUBLIC HEALTH SERVICE.

Boards will be convened at the Bureau of Public Health Service, 3 "B" street, S. E., Washington, D. C., and at a number of the Marine Hospitals of the Service, on Wednesday, May 31, 1916, at 10 o'clock a. m., for the purpose of examining candidates for admission to the grade of assistant surgeon in the Public Health Service.

The candidate must be between 23 and 32 years of age, a graduate of a reputable medical college, and must furnish testimonials from two responsible persons as to his professional and moral character, together with a recent photograph of himself. Credit will be given in the examination for service in hospitals for the insane, experience in the detection of mental diseases, and in any other particular line of professional work. Candidates must have had one year's hospital experience or two years' professional work.

Candidates must be not less than 5 feet 4 inches, nor more than 6 feet 2 inches in height, with relatively corresponding weights.

The following is the order of examination: 1. Physical; 2. Oral; 3. Written; 4. Clinical.

Candidates are required to certify that they believe themselves free from any ailment which would disqualify them for service in any climate.

Examinations are chiefly in writing, and begin with a short autobiography of the candidate. The remainder of the written exercise covers the various branches of medicine, surgery, and hygiene.

The oral examination includes subjects of preliminary education, history, literature, and natural sciences.

The clinical examination is conducted at a hospital.

The examination usually covers a period of about ten days.

Successful candidates will be numbered according to their attainments on examination, and will be commissioned in the same order. They will receive early appointments.

After four years' service, assistant surgeons are entitled to examination for promotion to the grade of passed assistant surgeon. Passed assistant surgeons after twelve years' service are entitled to examination for promotion to the grade of surgeon.

Assistant surgeons receive $2,000, passed assistant surgeons $2,400, surgeons $3,000, senior surgeons $3,500, and assistant surgeon-generals $4,000 a year. When quarters are not provided, commutation at the rate of $30, $40 and $50 a month, according to the grade, is allowed.

All grades receive longevity pay, 10 per cent. in addition to the regular salary for every five years up to 40 per cent. after twenty years' service.

The tenure of office is permanent. Officers traveling under orders are allowed actual expenses.

For invitation to appear before the board of examiners, address "Surgeon-General, Public Health Service, Washington, D. C."

BOOK REVIEWS

The American Atlas of Stereoroentgenology.
A quarterly edited and published under the sole auspices of the New York Roentgen Society. Editors: Leopold Joches, M.D.; William H. Stewart, M.D.; H. M. Imboden, M.D., with associates and correspondents throughout the world. The Southworth Co., Troy, N. Y.

This beautifully arranged quarterly fills the need for the daily practical application of this extremely important art to the practice of medicine and surgery.

The subject matter is entirely clinical, the descriptive text beginning with the earliest obtainable history of the case and, following through the X-ray laboratories, is verified in the operating and post mortem rooms, where possible. About eight cases are recorded in each number and each case is accompanied by a pair of beautiful stereoradiograms which can be viewed life size through a cliniscope. This is a loose-leaved journal, each number of which is provided with a neat cover, giving it the appearance of a book, which makes it an attractive as well as an instructive addition to any library.

Pathogenic Bacteria and Protozoa.
For students of medicine and physicians. By Joseph McFarland, M.D., Professor of Pathology and Bacteriology in the Medico-Chirurgical College, Philadelphia. Eighth edition; thoroughly revised. Octavo of 807 pages with 323 illustrations, a number of them in color. Philadelphia and London: W. B. Saunders Co., 1915. Cloth, $4.00 net.

This text-book of bacteriology, having passed into its eighth edition, has already demonstrated its value to the profession, who will no doubt welcome this latest edition, which has been so completely revised that it was necessary to reset the type. The subject matter, treated in a de-

(Continued on page 24)

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NAT ONAL PATHOLOGICAL LABORATORY

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(Continued from page 478)

tailed and masterful manner, is in two parts. One, "General," is devoted to the history, theory and practical laboratory methods of bacteriology; the other takes up the specific infectious diseases and considers each from the standpoint of bacteriology, patho-genisis, prophylaxis and treatment. Altogether this is a very satisfactory and complete treatise on the subject.

Laboratory Methods.

With special reference to the needs of the general practitioner. By B. G. R. Williams, M.D., member Illinois State Medical Society, American Medical Association, etc., and E. G. C. Williams, M.D., formerly Pathologist for Northern Michigan Hospital for Insane, with an introduction by Victor C. Vaughan, M.D., LL.D., Professor of Hygiene and Physiological Chemistry and Dean of the Department of Medicine and Surgery University of Michigan. Third edition. Illustrated with forty-three engravings. St. Louis: C. V. Mosby Company, 1915. Cloth, $2.50.

As suggested in its title, this work is adapted to the needs of the general practitioner. In order to practice medicine with any degree of intelligence, an adequate **working** laboratory is essential. The simplest and most inexpensive methods for fitting up and operating such a laboratory and the most reliable tests in their simplest form are described herein. The most common errors and how they may be avoided, the technique of the test from obtaining the specimen to the interpretation of the findings and the practical limits of its adaptability are given. Much of the confusing detail and multiplicity of tests has been omitted in this work and makes it a very valuable aid to the practitioner.

Post-Mortem Examinations. By William S. Wadsworth, M. D., Coroners Physician of Philadelphia. Octavo volume of 598 pages with 304 original illustrations. Philadelphia and London: W. B. Saunders Co., 1915. Cloth, $6.00 net; half morrocco, $7.50, net.

Of the many maneuvers that have added to our knowledge of the human body and the pathology affecting it, the post-mortem is probably the most valuable. The book under review is a most complete exposition of this subject and the large number of carefully selected illustrations is a very attractive feature. Though the subject matter could be condensed somewhat without decreasing its value, on the whole it offers both interesting and instructive reading. It goes into detailed description of the methods of technique and interpretation and offers an especially interesting chapter on the medico-legal aspect of post-mortem work. The author attempts to discourage the mere seeking for pathological specimens and urges that the operator shall view the subject not as anatomy and pathology but as a wonderful mechanism that has stopped. He wishes us not to see the organs only but the signs of their functions and how performed. He encourages thoughtful work but deplores the mechanically perfect but the pitifully narrow and inadequate work of the routine post-mortem examination. The subject is approached in a very broad-minded manner and may well be considered a valuable contribution to medical literature.

SOUTHERN MEDICAL NEWS

ALABAMA.

Dr. L. L. Lumsden, chief of the rural sanitary department of the United States Public Health Service, visited Tuscaloosa early in April to cooperate with the county health officers on the subject of sanitation and preventable diseases.

At Mountain Creek Dr. J. P. Elsberry, who has been physician in charge at the Alabama Old Soldiers' Home for ten years, has tendered his resignation, to take effect May 1. He will make his future home at Spring Hill, near Mobile.

At Mobile the city commissioners have employed men to work during the summer at pouring larvacide in all places where mosquitoes are likely to breed.

At Selma Dr. T. G. Howard, county health officer, announces that the February report on public health shows conditions to be the best in the history of the city. Great interest is shown in the clean up campaign.

At Eufaula the citizens enthusiastically observed April 4th as "clean up day," according to the proclamation of Governor Henderson. The colored people are to be specially commended for their response to this call. They left no room for complaint about doing their share of the work.

State Commissioner of Agriculture J. A. Wade has issued a circular letter to the manufacturers and dealers of food and feed stuffs in the state urging the protection of the health of the people by refusing to place on the market objectionable material of any kind. The letter calls their attention to the law as amended in 1916 and announces his intention to put it into full force and effect beginning April 1.

Dr. John A. Snell, of Sou Chow, China, addressed the class in the medical department of the University at Mobile. His subject was "The Work and the Need of Medical Missionaries in China."

At Mobile Dr. Charles A. Mohr, City Health Officer, in his report for March stated that there was a great discrepancy in the death rates of the white and colored people, caused by the large number of deaths from tuberculosis among the negroes. Sixteen negroes and one white died of tuberculosis. The total number of deaths in February was 91, of which 32 were whites and 59 negroes. Fourteen were between 70 and 80 years of age.

Dr. P. B. Moss, State bacteriologist and pathologist, the head of the State laboratory and of the Pasteur Institute at Montgomery, has tendered his resignation to Dr. W. H. Sanders, State Health Officer, and will remove to Selma, where he will be associated with Dr. Goldsby King.

(Continued on page 26)

"MAN BEGINS TO DIE AS SOON AS HE IS BORN!"

Obstipation---Stasis---Autotoxemia
hastens the process

To treat this Syndrome requires perfect lubrication.
Perfect lubrication calls for INTEROL.

Why experiment?

INTEROL has correct body, effective viscosity; no suggestion of flavor or odor (even when heated to 100° C.); has been hyper-refined and is safe.

INTEROL SECURES RESULTS IN HANDS THAT KNOW HOW—AND WHEN—TO USE INTEROL.

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A dozen tubes in a box. A Dollar a box

For { Face and Scalp Lacerations
Crushed and Lacerated Fingers
The "extra" suture or ligature for finishing the major operation

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Summer Skin Afflictions

—sunburn, chafing, prickly heat and the like—are often more satisfactorily relieved by

K-Y (REG U. S. PAT. OFF.) *Lubricating Jelly*

than by any other local remedy.

Colorless, non-greasy, water-soluble, absolutely non-staining to skin or clothing, and by all means the most cleanly and agreeable of all local applications, "K-Y" is unequalled as a means of controlling itching, allaying irritation and relieving capillary congestion.

As its soothing properties become known, "K-Y" promptly supersedes all other applications.

VAN HORN & SAWTELL
15-17 East 40th St. New York, U. S. A. AND *31-33 High Holborn London, England*

(Continued from page 24)

In Jefferson County the total receipts from the sale of Red Cross seals was $6,410.02, according to the report of Dr. George Eaves, secretary of the Anti-Tuberculosis Association of Jefferson County.

At Birmingham subscribers to the University Free Dispensary, now in course of construction, who have not yet met their subscription, are being called upon for funds to complete and equip the building.

Dr. B. B. Simms, of Talladega, was recently presented with a medal by the Southern Railway in appreciation of twenty-five years of service to that company.

ARKANSAS.

State and local health officers have made arrangements to co-operate with Dr. R. H. von Ezdorf and other officials of the United States Public Health Service in a campaign against malaria, to begin at once, and in the establishment of at least two model anti-malaria communities. One of the communities will be urban and the other rural. They will be chosen from districts where malaria is prevalent.

At Hot Springs arrangements have been perfected for the establishment of free clinics at the Government Free Bath House, the purpose of the clinic to furnish to indigent patrons of the bath house free medical service, to study the clinical efficacy of the waters of Hot Springs and to exclude from the bath house cases which might be a menace to its patrons. Dr. W. H. Deaderick was elected chief of the clinic and Dr. Loyd Thompson, secretary.

DISTRICT OF COLUMBIA.

At Washington the directors for the Association for the Prevention of Tuberculosis have recommended an increase of $5,000 in this year's appropriation for the Tuberculosis Hospital and an additional $2,000 for portable cabins. According to Dr. W. C. Woodward, of the board of directors, accommodations are entirely inadequate. The association strongly urges the segregation of dangerous and careless consumptives.

The Senate Committee on Public Health and National Quarantine reported a bill favorably, March 25th, to establish a national home for the care and treatment of the lepers in this country. The committee is of the opinion that for the protection of the public health, humanitarian treatment of persons afflicted with leprosy and the furtherance of scientific study and investigation of the disease, Congress should provide a home or homes for lepers. It is estimated variously, by supposed experts, that there are from 500 to 2,500 lepers in the United States.

FLORIDA.

At Jacksonville the Florida Anti-Tuberculosis Association has been organized with the stated purpose of instructing the public concerning the methods in the treatment in and prevention of tuberculosis and the mode of infection. This organization, which is to be affiliated with the National Association for the Study and Prevention of Tuberculosis also proposes to secure the proper legislation for the relief and prevention of this disease. Dr. L. A. Bize, of Tampa, was elected president; Mrs. Frank E. Jennings, Jacksonville, vice-president; Dr. Carol H. Frink, Jacksonville, secretary; Fred W. Hoyt, Jacksonville, treasurer; Dr. Joseph Y. Porter, Jacksonville; F. G. Fearnside, Palatka, and Mrs. W. S. Jennings, Jacksonville, honorary vice-presidents. Some of the most philanthropic men and women of the state were included in those named on the executive committee and board of directors.

At Pensacola, for the first time, the Escambia County Medical Society and the Dental Association held a joint session. The subject under discussion was the cause for the prevalence of typhoid in that county. After a lively debate the opinion of most of those present was that a strict enforcement of the sanitary laws of the community would go far toward arresting the outbreak.

At Lake City the Columbia County Medical Society elected the following officers for the ensuing year: Dr. L. M. Anderson, president; Dr. Dwight Rivers, vice-president; Dr. J. P. Long, secretary and treasurer.

GEORGIA.

At Macon in order to secure the necessary funds required to build the modern city hospital, as designed, the hospital commission has requested the permission of the mayor and council to call an election for the purpose of securing the consent of the people to issuing of additional bonds to the amount of $100,000.

At Columbus Dr. C. A. Peacock, one of the attending physicians of the Columbus Narcotic Hospital, has been appointed by the State Board of Health as physician in charge and it has been designated the official narcotic hospital for the Fourth Congressional District.

At Savannah Miss VandeVrede conducted the written examination for nurses on April 4. There were twenty graduate nurses who took the examination, which lasted two days. The practical examination was held at the Telfair Hospital for Women.

At Waycross there will probably be no special "clean up campaign," for the sanitary officers have been so active that that city has been kept unusually clean. The property owners failing to comply with the notices are facing charges brought against them in the recorder's court.

At Atlanta Dr. W. J. Bell, who maintains that arsenic is not a deadly poison, is conducting a demonstration under the observation of the State Prison Commission of Georgia. Under careful observation the seal of the arsenic bottle was broken and doses given to six small dogs, each receiving one, two, three, four, eight and sixteen grains. As a result of years of experiment with this drug, the doctor makes his claim and states that he has given as much as sixty grains to dogs without ill effect.

At Atlanta Dr. W. J. Auten, acting county physician, sustained a rather amusing though painful experience when a mule, embodying the temper and many of the attainments of the famous "Maud," shied into his car and kicked it

(Continued on page 28)

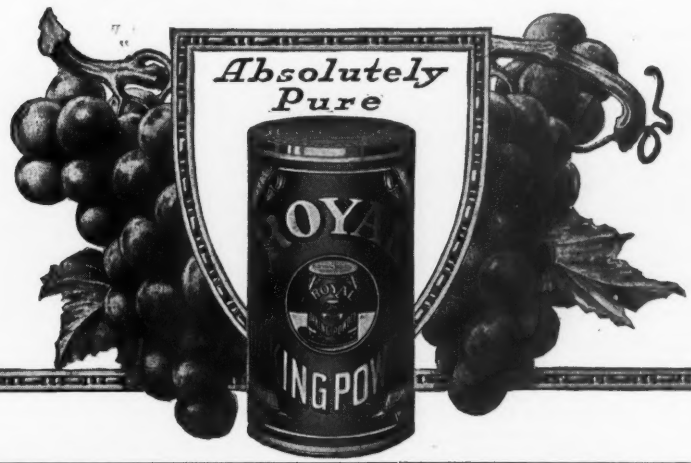
The Action of Cream of Tartar

Pure cream of tartar (acid tartrate of potash, obtained as a precipitate in the fermentation of grape juice) and soda are two of the ingredients of

ROYAL BAKING POWDER

The action of one ingredient upon the other liberates carbonic acid gas, leavening the food. Sufficient gas must be freed to make the breadstuffs light and spongy, and yet not enough to cause a flat, doughy taste. This gas must not distribute throughout the food any mineral acid salts, or any similar heavy residual substance.

Royal Baking Powder is pure, contains no alum, and is always the same; therefore it is reliable and insures healthful food.



(Continued from page 26)

over. Dr. Auten was pinned under the car but luckily escaped serious injury.

Through the efforts of Dr. M. M. McCord, Health Commissioner of Floyd County, nine surgeons from the United States Public Health Service have been secured to assist him in a sanitary survey of the county.

Deaths.

At Atlanta Dr. Bernard Wolff died after an operation at a local hospital and was interred in that city. He was 48 years of age, a native of Virginia, and a dermatoligist of international reputation. He had been president of the Atlanta Medical Society and also of the Georgia State Medical Association.

KENTUCKY.

At Greenville ninety-one examinations and twenty-two operations took place in the trachoma clinic on March 31. Dr. Bailey, of Madisonville, was in charge.

At Covington Dr. Phillip L. Coulter, surgeon in charge of the government hospital at Welch, while working among the mountaineers of that vicinity for the eradication of trachoma contracted the trouble and is now in a local hospital suffering from an acute attack.

At Shelbyville on March 14 the positions of jail and pauper physician were consolidated and Dr. Graham Lawrence was elected to the office. The health officer was placed upon a salary instead of the fees formerly received.

At Paintsville the residence of Dr. F. M. Williams and most of its contents were partially destroyed by fire on March 16.

Meetings are being held in a number of the precincts of Nicholas county by the Health League which is conducting a campaign in that county. Miss Marion Williamson of the State Tuberculosis Commission, is assisting the league in its work, and Miss Nell Johnson, of Louisville, is beginning her work as visiting nurse.

At Mt. Sterling, due to the efforts of Miss Williamson, of the State Tuberculosis Commission, the organization of "The Health and Welfare League" of Montgomery county has just been perfected, and Dr. W. R. Thompson was made president. The women will be aided in their work by the different fraternal organizations and several entertainments have been planned for the benefit fund.

Dr. Wallis Bailey, of Salyville, is critically ill in Huntington, W. Va., where, while on a business trip, he suffered a stroke of paralysis.

Deaths.

Dr. W. P. Miller, of Calhoun, died of heart disease on March 17. He was 71 years old.

Dr. L. Springfield died in Evansville on the night of March 31 at the age of 76 years.

Dr. J. B. Watson, while en route to his home in Deerfield, Kan., from Valparaiso, Ind., was struck by a street car and killed in Chicago on March 26. Dr. Watson was born in Carter county, Kentucky, and had relatives in Ashland.

Dr. Samuel L. Tabb, aged 71, and forty years a practitioner in Elizabethtown, died there after a prolonged illness on March 23.

LOUISIANA.

At New Orleans the Louisiana State Board of Health is inspecting the water supply and, after locating the impure water, will employ large metal signs to warn the public against its use.

At Mansfield on March 26 Dr. B. D. Cooper was operated on for appendicitis. He is reported to be recovering rapidly.

At New Orleans Dr. Oscar Dowling, president of the State Board of Health, is prosecuting F. H. Seeley, truss advertiser, for "fraudulent advertising" and practicing medicine without a license. Seeley is said to have claimed, untruly, that his trusses were sold by him to and were approved by the government.

At New Orleans a local committee of the American Hay Fever Prevention Association reported very favorably as to the progress of the campaign against this disease. The areas formerly covered by weeds are being cultivated even though the ordinance is not as yet being actively enforced. The removal of the weeds is hoped to exert a benign influence upon the sufferers from this malady.

At Shreveport on March 27 the Fourth District Medical Society held its first semi-annual meeting at the Hotel Youree. Every parish in the Fourth Congressional District contributes to the membership of this association and the large number of physicians who were able to attend listened to a very interesting program.

At New Orleans at a meeting called by Commissioner H. W. Newman of the public safety department, those opposing the location of the Dibert Memorial Hospital for Consumptives on Tulane and Carrolton avenues were assured that there was no danger of the transmission of the germs to those living near. The local physicians stated to the property owners that a well regulated hospital is never a menace to those living in the immediate vicinity and urged the above mentioned location as the ideal site for the institution. Two hundred thousand dollars was donated by Mrs. Eve Christine Dibert for the erection of a tuberculosis hospital.

At Covington Dr. Winfield K. Ney, of Madisonville, who has returned after a stay of five months in France gave a lecture at the court house.

At New Orleans the Orleans Parish Medical Society unanimously indorsed the use of the mint as a favorable location for the home for tubercular patients.

At New Orleans in the banquet hall of the St. Charles Hotel on the night of March 17 the Irish Doctors' Association of New Orleans was organized. The purpose of the organization is to study the noteworthy deeds of the Irish members of the profession.

Deaths.

Dr. R. A. Duke died at his home in Lake Charles March 25. He was formerly from Nashville, Tenn.

Dr. Arthur Gilbeau, a well known and respected physician of Breaux Bridge, died at his home on March 16 at the age of 61 years.

(Continued on page 30)

Fifty Bran Foods

Each 25% Flaked Bran

Pettijohn's Flour, used in place of white flour, means this:

First, an extra nutritious food.

Second, an efficient bran food. For each is 25 per cent bran, and in flake form as you want it.

One may use it in 50 household recipes, which will be more pleasing for it.

With Pettijohn's Food and Pettijohn's Flour a bran course is made delightful. Every meal may have its quota, hidden in some dainty. You will find these two foods perfect.

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Two Bran Foods

Pettijohn's Breakfast Food—A soft wheat rolled into luscious flakes, hiding 25 per cent unground bran. A morning dainty liked by everyone. 15c per package.

Pettijohn's Flour—Fine patent flour mixed with 25 per cent special bran, largely in flake form. To be used like Graham flour in any recipe. 25c per large package.

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Pure pine oil.

Is used undiluted.

No dressing can surpass it

On cuts, burns, bruises,

Lacerations, abrasions.

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SHERMAN'S BACTERINE

Preparations with a record for
RELIABILITY
31 Different Varieties

Typhoid Fever

Yields more readily to

Typhoid Vaccine

than to any other remedy. When given early it often aborts the course of the disease.

Write for Literature.

G. H. SHERMAN, M.D.
Detroit, Mich.

Daily users of Vaccines use SHERMAN'S

(Continued from page 28)

MARYLAND.

At Annapolis the State Board of Health, it is feared, will be greatly hampered in its work by the wholesale slashing of its appropriation by the committees of Finance, Ways and Means. The present appropriation is $38,000 below the 1914 and $48,500 below that asked for.

At Baltimore Dr. Henry M. Hurd, professor emeritus of psychiatry at Johns Hopkins University, and formerly superintendent of Johns Hopkins, celebrated his fiftieth anniversary in the practice of medicine at a dinner at the Maryland Club on March 25.

Deaths.

Dr. Harry C. Jones died of apoplexy in Baltimore on April 9. He was professor of physiological chemistry in the Johns Hopkins University.

Dr. Christopher C. Wingo died at the Mercy Hospital, Baltimore, on March 21 at the age of ninety-two years. The shock from a fall on the stairs caused his death.

MISSISSIPPI

Dr. D. W. Jones has removed from Brookhaven to Jackson, where he will devote his attention to pediatrics and orthopedics.

The bill providing for the establishment of a State Tuberculosis Sanitarium has recently been passed.

At Winona, on April 4th, a meeting was held in the interest of the clean-up campaign recently inaugurated in that city. The ladies of the city were the prime movers in this work.

The Mississippi Anti-Tuberculosis Campaign Committee has adopted a novel device for stimulating interest in their work. They are showing the moving picture film, "The Temple of Moloch." This film is rented from the National Association for the Prevention of Tuberculosis. It is said to be a very interesting film with an attractive plot and was originally produced by the Universal Film Manufacturing Co.

At Corinth an effort is being made to institute a "Better Babies Week" to be held the first week of May.

At Jackson, according to the decision of Judge W. H. Potter, Circuit Court Judge, Dr. E. B. Poole will retain his office of County Health Officer of Hinds county.

At Columbus a campaign for cleanliness has been inaugurated by the Ladies' Civic League.

At Jackson, due to an increase in the appropriation for the purpose, a new State Bacteriological Laboratory has been fitted up.

NORTH CAROLINA

The General Assembly of North Carolina has passed a law, referring to Hyde county alone, to the effect that in all cases where infected stock has been or will be killed by order or advice of the State Board of Health, the owner of such stock shall receive compensation for his loss from the treasurer of the county, out of the general funds of the county.

SOUTH CAROLINA

At Greenville, health day was observed in all the schools and colleges of the city, and many of the schools throughout the county. Papers were read and talks made by the students and some of the foremost physicians of the city. A wholesome sentiment for and interest in this important work was stimulated and it is hoped that sanitation will receive a great impetus by meetings of this sort.

At Greenville, preparatory to launching the government health survey of Greenville county, Dr. L. L. Lunsden, of the United States Public Health Service, and James A. Hayne, State Health Officer of South Carolina, addressed a large body of representative citizens. The subject elaborated was "Sanitation and Health Conservation," and the nature of the plan was described to the interested citizens.

At Columbia, after April 15th, an order in conformity to the state law will become effective whereby the exposure to dust, flies, etc., of foodstuffs of any kind upon the sidewalks or alleys of that city will be prohibited. The act demands that "all such intended for human consumption and offered for sale shall at all times be kept free from contamination by dust, dirt, flies, insects, cats, dogs, or other domestic animals."

At Winston-Salem, in order to prevent an epidemic of scarlet fever ,an order signed by the mayor closing all schools and churches for a period of twelve days was issued on the 5th of April.

TENNESSEE

According to the report of the Tennessee State Board of Health, through Dr. H. H. Shoulders, State Registrar of Vital Statistics, there were 497 deaths from malaria in the state during the past year. It is estimated that about 300 cases of the disease have occurred for every death. The appalling incidence of this disease represents a great economic loss to the state.

At Memphis a negro, G. H. W. Walker, was arrested for sending medicines through the mail contrary to the statutes. The authorities hold that as there is doubt as to the value of the medicines and that as the negro does not hold a license to practice, the sending of his remedies through the mail is unlawful.

At Dyersburg, under the auspices of the civic department of the Woman's Club, "Baby Day" was held on April 1st.

At Knoxville, the Tennessee State Medical Association held its eighty-third annual session on April 4th, 5th and 6th under the presidency of Dr. E. C. Ellett, of Memphis. The following officers were elected for the ensuing year: President, Dr. Charles N. Cowdin, Northville; Vice-Presidents, Dr. C. J. Carmichael, Knoxville; Dr. J. T. Moore, Allgood, and Dr. John L. McGehee, Memphis; Secretary, Dr. Olin West. The meeting next year will be held in Nashville.

At Nashville, Dr. J. L. Leach, negro physician, was appointed Medical Inspector of colored schools. His appointment followed the receipt of many favorable recommendations as to his character and ability.

At Memphis, a number of health officers of the state gathered to attend a meeting of the West

(Concluded on page 32)

For Immunization and Treatment
of Typhoid and Paratyphoid

Typho-Serobacterins Mixed (mixed sensitized typhoid vaccines) are recommended by Castellani, Broughton-Alcock, Besredka, Gay, and other prominent authorities, since they afford immunity against the typhoid bacillus and the paratyphoid A and B, which latter infections cause about ten per cent of cases usually diagnosed as typhoid.*

Typho-Serobacterins (sensitized bacterial vaccines), being saturated with specific antibodies, are attacked by the complement and taken up by the phagocytes much more rapidly than unsensitized vaccines.

Typho-Serobacterins are characterized by

Rapid production of immunity
Immunity begins within 24 to 48 hours
Reduction of local and general reactions
Freedom from toxicity.

Typho-Serobacterin Mixed Mulford is furnished in packages of three aseptic glass syringes, graduated as follows:

	First dose	Second dose	Third dose
Bacillus typhosus....	1000	2000	2000 million
B. paratyphosus "A"	500	1000	1000 million
B. paratyphosus "B"	500	1000	1000 million

Typho-Serobacterin, Immunizing, Mulford, is furnished in packages of three aseptic glass syringes, graduated to contain: First dose, 1000 million, followed at 2 to 5 days interval by second dose, 2000 million; third dose, 2000 million sensitized typhoid bacilli.

In the Treatment of Typhoid Fever, striking results are reported from the therapeutic use of Typho-Serobacterins. Krumhaar and Richardson† analyzed more than 1800 cases of typhoid; in 95 per cent of these, favorable results were secured.

Typho-Serobacterin, Therapeutic, Mulford, is supplied in packages of four aseptic glass syringes, each containing: Syringe A, 250 million; Syringe B, 500 million; Syringe C, 1000 million; Syringe D, 2000 million sensitized typhoid bacilli.

Full literature mailed upon request.

* British Medical Journal, 1915, 1445; Jour. Royal Army Med. Cor., 1911, XVI; Press Medicale, Feb. 10, XXIV, No. 8, p. 5764; Lancet, Sept. 19, 1914; Jour. A. M. A., June 26, 1915, editorial; Amer. Jour. Med. Science, 1915, CXLIX 406; Jour. A. M. A., August 7, 1915; Jour. A. M. A., July 24, 1915. † Am. Jour. Med. Sci., 1915, CXLIX 406.

MULFORD FOR THE CONSERVATION OF LIFE LABORATORIES

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MULFORD FOR THE CONSERVATION OF LIFE LABORATORIES

(Continued from page 30)

Tennessee Anti-Malarial Conference on April 1st. Energetic steps are being taken by this new organization to eradicate the disease from this section of the South. The Tennesseans will be joined in their campaign by the health authorities of Arkansas and Mississippi. The following officers were elected: Dr. William Kraus, Memphis, President; Dr. J. L. Andrews ,Memphis, Vice-President; E. F. Turner, Memphis, Secretary; and Dr. Joseph H. White, U. S. P. H. S., director of field work campaign.

At Knoxville, Dr. L. E. Ragsdale has been appointed to succeed Dr. Michael Campbell as superintendent for the East Tennessee Hospital for the Insane.

At Knoxville, an emergency tuberculosis camp has been established. The open pavilion is to be used. The movement was inaugurated by the Board of Associated Charities.

Dr. G. T. Aycock has been elected to succeed Dr. J. M. Oliver as superintendent of the Davidson County Tuberculosis Hospital.

The State Board of Health reports 839 deaths from pellagra in the state during the year 1915.

Deaths

Dr. A. J. Copeland, after a long illness from heart trouble, died at his home at Fetzerton on March 17th. He was 80 years of age.

Dr. J. M. Sparks died suddenly at his home at Liberty Church on March 23d at the age of 75 years.

Dr. Hans I. Grivelly, a native of Switzerland, died at his home in Hohenwald on March 27th.

TEXAS

At Marlin, the ladies of the Civic League are conducting an active campaign in order to induce the City Council to take steps to procure a water purification plant.

At Wharton, on April 14th, the following officers of the Wharton District Medical Society were elected: Dr. D. F. Redwine, El Campo, President; Dr. H. Passmore, El Campo, First Vice-President, and Dr. H. W. Gray, El Campo, Secretary.

Dr. S. L. Scothorn, of Dallas, was elected President of the Texas State Board of Medical Examiners at a recent meeting. The board will meet in San Antonio in June.

Typhus fever was reported to the State Board of Health during the month of February in El Paso, Kinney, Maverick, Webb, Frio and Bexar counties. This invasion has followed the main lines of travel from the border to the interior of the state. The disease has been confined to Mexicans of recent entry in almost all the cases reported and has not spread to any extent.

Deaths

Dr. Carlos E. Husk, of Parral, Mexico, succumbed to an attack of typhus fever in Laredo on April 20th.

Dr. Alex Irwin, of Wallis, died suddenly at his residence on March 23d. He was a Virginian by birth and served during the Civil War as chief surgeon of the Seventh Tennessee cavalry.

VIRGINIA

According to a report of the State Health Department of Virginia, the cost of the cases of typhoid in the state last year was $4,000,000. Though the conditions of sanitation are gradually improving, there were 6,008 cases reported last year.

At Richmond, according to a decision rendered by Assistant District Attorney Anderson, none but the indigent and emergency cases shall be admitted to the Virginia Hospital.

At Richmond, the Faculty of the Medical College of Virginia was subjected to the following changes: Dr. Robert C. Bryan was elected to the chair of genito-urinary surgery; Dr. Charles C. Haskell, the chair of pharmacology, and Dr. J. M. Hutchinson that of therapeutics. Dr. A. L. Gray was transferred from the chair of physiology to that of Roentgenology, and he will be succeeded by Dr. C. H. Lewis. Dr. E. Guy Hopkins was elected professor of Clinical Pathology.

Deaths

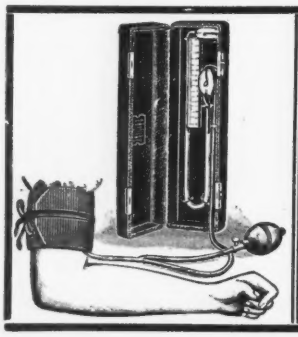
Dr. J. Gordon Rennie, of Petersburg, died in a New York hospital on March 30th at the age of 43 years.

Dr. Thomas M. Dunn died at his home in Free Union, Albemarle county, on April 3d at the age of 80 years.

Dr. George T. Surface died at his home in Auburn on March 14th at the age of 41 years.

WEST VIRGINIA.

At Fairmont, Dr. L. N. Yost, County Health Officer, is making a determined effort to induce the physicians of the county to comply with the law requiring the reporting of the infectious diseases and all births and deaths.



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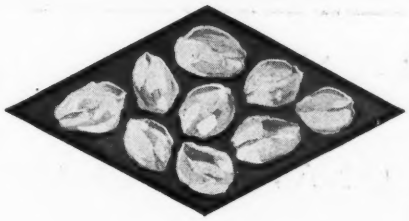
Doster Northington Drug Company, Birmingham, Ala.

Surgical Instruments and Hospital Supplies



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Undeveloped oats, we argue, are unfit for human food. And they lack this tempting flavor.

Quaker Oats are always made of queen grains only. The grains are plump and full-grown. The flakes are large and luscious. Yet they cost no extra price.

We feel that you who advise on foods should know this.

Quaker Oats

The Luxury Dish

This is the leading oat food the world over, because of this extra quality. Even in Britain, the home of Scotch and Irish oats, Quaker is the largest-selling brand.

Regular package 10c
Except in Far West and South

The Quaker Oats Company
Chicago (1261)

THE STORM BINDER AND ABDOMINAL SUPPORTER
Patented

No Leather, No Whalebones, No Rubber Elastics
Washable as Underwear

Adapted to use of Men, Women, Children and Babies

For Hernia, Relaxed Sacroiliac Articulations Floating Kidney, Low and High Operations, Ptosis Pregnancy, Pertussis, Obesity Etc.

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3. Or that of any other person (not necessarily an assistant or agent),
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